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NEWSPAPER

Another Look at EFT

Systems Seen Hiking Checkout Time 25%

By Toni Wiseman
Of the CW Staff

WASHINGTON, D.C. — Electronic funds transfer (EFT) systems in supermarkets could lengthen the time shoppers spend in a checkout line by up to 25%, according to the Food Marketing Institute (FMI).

In comments submitted to the National Commission on Electronic Fund Transfers here, the FMI expressed its concern that "a pro-EFT bias may have restricted the commission's ability to function objectively on behalf of consumers."

Although food wholesalers and retailers want to make sure there are more than just cost benefits in EFT systems, it would hardly be in the consumer's interest to endorse EFT if it is not economically feasible, the brief said.

After questioning whether the cost increases associated with the introduction of EFT might not exceed potential cost savings for supermarket shoppers, the institute expressed reservations about convenience, reliability and customer liability under EFT systems.

Citing a test conducted by Dillon Stores in Kansas, the FMI noted that if only the check transactions currently being ad-

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Boon or Boondoggle? Answer Still Unsure

By Don Leavitt
Of the CW Staff

NEW YORK — Electronic funds transfer (EFT) systems could turn out to be a boon to the banking industry and its customers — or a boondoggle costing billions of dollars in capital equipment, staff time and marketing efforts.

Which alternative occurs depends to a large extent on how well bank marketing people do their jobs, the spokesman for a market research firm told last week's Operations Conference of the National Association of Mutual Savings Banks.

Robert L. Kramer, president of Actionfacts, Inc., admitted he was emphasizing the failures and negative aspects of EFT "to balance the usually rosy view presented by others." He said, however, that for the moment "few EFT services truly meet a public need or desire and even fewer offer real advantages to the banks."

That being the case, he asked his audience, "What should individual banks do with regard to EFT systems?"

Kramer had several answers. "First and easiest and least expensive keep informed. Attend conferences, read ar-

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Frustrated, Disappointed

Dismissed Jury Favored Calcomp

By Edith Holmes
Of the CW Staff

LOS ANGELES — Disappointment and doubt over the wisdom of U.S. District Court Judge Ray McNichols's decision to abort the trial of California Computer Products, Inc.'s antitrust suit against IBM prevailed among the members of the dismissed jury here last week.

While the majority appeared to lean toward Calcomp after listening to three months of evidence against IBM, all wanted to hear the mainframer's defense.

Individually prodding themselves on their collective open mind, they earned the accolade of "a quality jury" and the respect of the parties and McNichols.

With their dismissal, they acknowledged some relief that their part in the trial was over, but expressed frustration at having seen "only half the puzzle."

That frustration was eased somewhat, however, by the feeling that they were now free to form some opinions about the verdict they might have reached. Interviews with 10 of the 12 jurors indicated six were leaning toward Calcomp following the conclusion of its presentation. Four said they thought they would have voted in favor of IBM.

One woman stated she knew of only two members of the jury who were really for IBM prior to the judge's decision to terminate the trial. Postdismissal talks with the jury turned up two people who said "Calcomp had no kind of case."

Clearly, most were waiting for the rest of the case. But in addition to hearing IBM's interpretation of the facts, several also looked forward to McNichols' instructions to them on what it means to violate the antitrust laws.

"I might come to a determination of what's morally wrong," said one juror, "but what's legally wrong?"

"No IBM actions seemed illegal. Maybe some of their actions — particularly with the interface for the 2314 disk drive — weren't nice. But what can you do about that?" one woman asked.

Another juror suggested, however, that while IBM's Fixed-Term Plan and its disk drive price cuts alone didn't appear

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Calcomp vs. IBM Ended; Evidence Lacking: Judge

By Edith Holmes
Of the CW Staff

LOS ANGELES — "Reluctantly but firmly," Judge Ray McNichols sided with IBM and toward California Computer Products, Inc.'s $102 million antitrust suit against the mainframer out of district court here for lack of evidence.

In the wake of the suit's Feb. 11 dismissal, Calcomp said it will appeal McNichols' decision.

McNichols' decision granting IBM's motion to dismiss the case came as a surprise even to IBM, the corporation conceded. IBM had not even begun to present its defense to the jury. The judge said he granted the motion because Calcomp failed to present sufficient evidence to show IBM had unlawfully monopolized the general-purpose computer systems market, the movable-head disk market and the plug-compatible disk market.

"For some time prior to the commencement of this trial, I held the view that the plaintiff had, at best, a very thin case for antitrust relief," he stated. "I realized the importance of this case to the client, the tremendous expenditure of time and effort which has gone into the preparation and the potential wide-ranging effect of any decision."

As a result, McNichols said, he decided to be "most liberal" in permitting Calcomp the fullest opportunity to present its evidence and to prove a case.

The judge took a little over an hour and a half to reach his decision following arguments by both sides on IBM's motion for a directed verdict.

McNichols said he found no "substantial" evidence to permit judge or jury to

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Proposed IRS System May Pose Threat to Privacy, Study Warns

By John P. Hebert
Of the CW Staff

WASHINGTON, D.C. — The Internal Revenue Service (IRS) has proposed a Tax Administration System (TAS) that could violate individuals' constitutional rights, a government draft report has warned.

The Office of Technology Assessment (OTA), a research arm of Congress which helps evaluate proposals for government systems employing new technology, reviewed the IRS proposal for a decentralized computer system to replace the existing 20-year-old system used in the administration and collection of income taxes.

The proposed TAS represents a complete redesign of IRS' basic DP methods and equipment at a cost estimated at $750 million to $1 billion, according to the OTA draft report. The IRS wants it to be installed in 1981.

Meanwhile, no formal report on the impact of TAS has been issued by OTA, although more than a year has passed since the House Ways and Means Committee requested the review, according to sources here.

In addition, no hearings are presently scheduled by any congressional body to gain a better understanding of the proposed IRS system, the sources said.

The IRS said its present system is obsolete and a new system could provide additional, needed benefits.

In its proposal submitted for OTA review, the IRS stated taxpayer services would be improved by processing more returns more quickly, by having more information readily available on more people to promote tax computation efficiency and fairness, and by allowing expansion for the future, the OTA draft stated.

For these same reasons, however, the TAS also is capable of increased information abuse and the "potential for surveillance, harassment or political manipulation of [tax] files, for which specific controls and safeguards are of concern to Congress," the

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I/O Interface Standard Closer

By Nancy French
Of the CW Staff

WASHINGTON, D.C. — The American National Standards Institute (Ansi) X3T9 subcommittee has voted to publish the proposed I/O channel interface standard for public review and to send it to the full Computer and Information Processing Subcommittee (X3) of the National Bureau of Standards for subsequent balloting.

The X3T9 subcommittee's vote was 33 in favor, eight against and seven not responding.

The committee's vote brought the nearly seven-year-old proposed interface standard a small step closer to approval by the National Bureau of Standards' full Ansi board and eventually by the Secretary of Commerce.

But the standard — which ultimately could save money for both government and industry users by allowing systems to be configured with components from independent competitive sources — is still years away from being implemented by manufacturers, according to Bill Hanrahan, director of standards for the Computer and Business Equipment Manufacturers Association and secretary of the X3T9 subcommittee.

The next step in this voluntary standard-setting process is publication of the proposed interface standard in "Ansi Standards Action," the organization's biweekly newsletter, followed by a four-month period during which comments may be submitted, Hanrahan said.

After all comments are received and responded to by the subcommittee, a process that could take months or even years, the final draft will be recirculated to the X3 committee members along with a letter ballot.

If the final draft is approved, the proposal will then be reviewed by the Ansi

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In Quest for Trial Documents

Itel Complains About IBM 'Harassment'

By Catherine Arnst
Of the CW Staff

NEW YORK — IBM has unreasonably "oppressed and harassed" Itel Corp. in its attempts to obtain internal corporate documents for the U.S. vs IBM antitrust case, an attorney for Itel charged recently.

For two years, IBM has pressed for documents in regard to the upcoming testimony of Gary B. Friedman, vice-chairman of the board, executive vice-president and cofounder of Itel and a government witness.

In an affadavit filed before Judge David N. Edelstein, Friedman's attorney, Norman Roy Grutman, claimed that IBM attorney Max Shulman told him that if Friedman did not testify adversely to IBM, or did not testify at all, the attempts to obtain documents which would "place the vitals [of Itel] in the hands of our greatest competitor" would be stopped.

This is a potentially dangerous claim, for if Shulman had been trying to subvert the testimony of the witness through a threat, it would be a violation of the canon of legal ethics, sources said.

In its own memorandum on IBM's attempts to obtain additional Itel documents, the government supported Grutman's charges.

In the case of Itel, IBM requested documents written after Dec. 31, 1974. The government asserted that Friedman's testimony will be completely confined to actions before that time.

The documents sought concern new developments at Itel since that time which made the firm more competitive with IBM. Itel has already provided about 1,000 boxes of documents, including all those up to the present time that deal with noncompetitive areas, Grutman claimed.

IBM said it has "gone out of its way" to minimize the inconvenience and expense to Itel and made five separate trips to Itel.

An agreement was reached in September between Grutman and Shulman to establish Dec. 31, 1974 as a cutoff date on documents in competitive areas.

Shortly after the September agreement was reached, documents on noncompetitive areas were received which were dated after Dec. 31, 1974.

IBM then requested further production.

"IBM attorneys could not conceivably have received and analyzed the mass of materials Itel provided to substantiate a claim of inadequacy" before it attempted to probe beyond the agreed upon cutoff date, Grutman said.

"The timing by which this occurred strongly suggests IBM never intended to abide by [its] September agreement and dealt with us in bad faith in the making of it.

'Persecutorial Effort'

"IBM is continuing to exert the ponderous weight of its unique legal capabilities in a persecutorial effort to crush Friedman's effectiveness as a witness," Grutman added.

Friedman agreed with his attorney. "I cannot think that my company and its fortunes should be offered as a sacrifice to IBM who apparently seeks to harass us, perhaps with the goal in mind of causing me to decline to testify to avoid an undue burden on the company," Friedman said in his own affadavit.

IBM's actions in regard to this and other witnesses prevent the government from obtaining complete, candid and unfettered testimony of witnesses, counsel for the government said.

Those actions, "on becoming known to other prospective witnesses called on behalf of the U.S., will have a chilling effect on their testimony or on their willingness to testify, thus depriving the people of the U.S. a fair trial," the government said in its memorandum.

Attorneys for the government claimed there have been a "succession of incidents since the inception of this trial" that demonstrate IBM's abuses of subpoena power.

One such incident described concerned a conversation on Jan. 24 between Thomas D. Barr, lead IBM attorney, Raymond Carlson, lead government attorney, Thomas Gardner, a Memorex Corp. witness for the government, and Ralph Alldredge, Gardner's attorney.

Barr: Of course, whether [the cross-examination] will take a day and a half depends on how long it takes you to answer my questions correctly.

Gardner: I always answer questions correctly.

Alldredge: That, of course, is not intended to influence the witness' testimony?

Carlson: On the contrary, it is intended to influence the witness' testimony.

Barr: No, it is intended as an incentive.

Gardner, a resident of California, was on the stand 11 days, five of which were spent under cross-examination. His testimony stretched out over four weeks.

Itel was granted an unusual request to give oral argument last week.

EFT Seen Hiking Checkout Time

(Continued from Page 1)

ministered at the supermarket point of sale were converted to EFT, the average transaction time would increase about 2.5%.

But if substantial cash transactions were converted to EFT transactions, as many EFT advocates feel will happen in time, then every transaction which formerly was consummated with cash would be about 28 seconds longer.

"It would appear that if the Kansas test numbers are correct, every cash transaction converted to an electronic funds transfer would increase the transaction time by approximately 25%," the FMI told the commission.

FMI questioned the value of locational convenience, touted by some advocates as a major selling point for EFT. "Research has shown that people do not see the current payment system as either inconvenient or costly to the individual," the FMI said. "Offering EFT services in a supermarket will probably make them more accessible to the typical customer in space and time. But since the individual is reasonably satisfied with the current situation, will he assign a significant value to greater accessibility?" the FMI asked.

"Customers have already posed the question as to why they should change their behavior just so the supermarket and the bank should benefit," the institute said.

Raising the questions of who is responsible for the security of funds accessible through an EFT system and who is responsible for a breach of customer privacy that takes place through an EFT system, the FMI suggested customers should enjoy protection similar to that currently provided with credit cards.

"Two other topics that are related to the issue of liability and risk involve stop-payment provisions and availability of a customer's records for his inspection."

"Neither of these topics become important until the customer encounters a difficulty in making or verifying a payment or deposit, but both can be seen to be of critical importance to a customer under such circumstances," FMI stated.

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West Coast Firms Suing IBM Undaunted by Calcomp Dismissal

By Edith Holmes
Of the CW Staff

LOS ANGELES — Despite the recent dismissal of California Computer Products, Inc.'s antitrust case against IBM, four out of the remaining five West Coast companies charging the corporation with monopoly power still want to go to trial.

Only Hudson General Corp., which is represented by the same law firm that handled Calcomp's suit against IBM, would prefer to wait until the Ninth Circuit Court of Appeals reviews U.S. District court Judge Ray McNichols' decision to abort the Calcomp proceeding for lack of evidence of antitrust violations.

In a meeting with McNichols here last week to determine the next steps to be taken in the consolidated West Coast cases, Memorex Corp., Foro Precision, Inc., Transamerica and DPF, Inc. objected strenuously to the judge's suggestion that the trials of their cases await the outcome of Calcomp's appeal.

IBM has no objection to waiting for the appeals court's decision, particularly since it believes an affirmation of McNichol's ruling might make trials in the other cases unnecessary, according to its attorneys.

Future of McNichols

Regardless of whether the remaining West Coast cases go to trial, it is unlikely McNichols will hear them. The judge made it clear in his meeting with the firms' representatives that unless they all want him to continue, he is inclined to find them new judges.

But McNichols did suggest his knowledge of the industry and of the problems associated with their cases might be well used should he serve as the pretrial judge. No one seemed to object to having McNichols assume this role.

Where McNichols will find other judges willing to hear these cases is another matter — particularly with the next major trial scheduled at the beginning of this summer. Some of the attorneys attending the meeting speculated there wouldn't be another West Coast trial of IBM until the fall, assuming the cases don't wait for the Calcomp appeal.

Hudson prefers to hear the appeals court's decision because many of its issues are Calcomp's, according to Maxwell M. Blecher, attorney for both firms. Blecher, who noted Hudson's limited resources for trying an antitrust suit of this kind, suggested not many judges would want to sit through the Hudson trial until a final decision is made on the Calcomp suit.

In addition, Blecher told McNichols he had done the best job he could for Calcomp and, from a practical viewpoint, didn't know what else he could do for Hudson.

While IBM and Calcomp have no real dispute over the continuation of the West Coast cases before they hear from the appeals court, they have their differences over the schedule for the trial of IBM's $18.9 million trade secret theft case against Calcomp.

Contending IBM's trade secret counterclaim to Calcomp's antitrust charges are "silly-assed" and were filed chiefly for effect, Blecher argued Calcomp should be permitted at the very least to devote its limited resources to the appeal of the antitrust case without also having to worry about the trade secrets trial.

While he conceded IBM would not be severely damaged by a delay in holding the trade secret trial, lead IBM attorney David Boies affirmed the corporation's intention to pursue it — and with relish. It's only right and fair, he contended, and besides, "we have them cold."

McNichols indicated, however, that the trade secrets theft matter could wait until after the appeal.

Transamerica can't wait to go to trial against IBM. Its attorneys claim they will bring new evidence to hear on the now-familiar issues involving antitrust and IBM.

Transamerica's case will examine what the Calcomp, Telex and Greyhound trials have failed to cover so far: what IBM's price margins were before and after price reductions and increases and whether IBM price cuts were ever below costs, one company lawyer said.

If all the West Coast cases go to the Supreme Court and are treated together, Transamerica wants to be sure it has this financial information in the record, he added.

When the West Coast cases were first consolidated, all the parties opposing IBM seemed to look forward to the "bellwether" effect of the first case, one IBM attorney recalled. Everyone thought whoever went first would win.

Now there seems to be some tendency on all parts to dissolve the confederation. In the course of the meeting with the parties, for example, McNichols learned that Transamerica would prefer to go off on its own if it could receive a more expeditious trial; that no one was enthusiastic about a suggestion that only those issues which are new to the courts be tried, pending the Calcomp appeal; that Forro wants IBM's counterclaim against it to be tried along with its antitrust charges against the mainframer but that its partner in litigation, Memorex, does not.

'Zero' Impact on U.S. vs. IBM

NEW YORK — The directed verdict in California Computer Products, Inc.'s antitrust case against IBM will have "zero" effect on the U.S. government's case against IBM, according to one Justice Department attorney.

"Calcomp put in a superb case with overwhelming evidence. The judge either misunderstood the industry or the law or both," he said.

Judge Ray McNichols' comments from the bench regarding his opinion that Calcomp had a "very, thin case for antitrust relief" shows "he had made up his mind even before the case began," the Justice Department attorney said.

He indicated the government will ignore the decision for that reason.

The U.S. case is much larger than the Calcomp action, another Justice Department source noted last week.

He indicated that IBM has never gone to court on all of the issues raised by the government case and that while it has apparently won in the Calcomp action, as it did earlier in the Telex Corp. case, those were more limited actions.

The only private suit that contained all of the issues included in the government case, he noted, was the Control Data Corp. case, which the two firms settled out of court.

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The Shadow Knows Now. . .

What did the real jury's shadow think of the California Computer Products, Inc. vs. IBM case?

Dr. Donald L. Vinson, associate professor in the Graduate School of Business Administration at the University of Southern California (USC) and the man hired by IBM's law firm to set up a "surrogate jury," said his panel of six people suggested to him that IBM would have won had the case gone to the jury.

Describing himself as a social scientist and intellectually neutral, Vinson said the shadow jury indicated they believe IBM is on top and because it's very good and totally committed to excellence and quality.

He personally did not feel that way about the corporation when he began the project, he said, adding that he only attended the Calcomp trial once and tried not to form any impressions of his own about it.

Emphasizing that his observations about the jury's ultimate verdict were preliminary, Vinson said he plans to conduct an analysis of the raw data obtained from the surrogate jury this summer.

The shadow never knew where the money for the project came from and they never were to ask. They weren't permitted to tell their families or anyone else what they were doing except that they were employed by a USC professor.

Vinson stressed that all of his dealings were with Ronald Roffe, an attorney with Cravath, Swaine & Moore, and that the law firm, not IBM, funded the project and had access to all its data.

The surrogate jury had trouble dealing with the complexities of some of the evidence, Vinson stated. There were definite reactions to the personalities of the attorneys and the witnesses involved in the case.

IBM's lead attorney David Boies, for example, was considered to have "a satisfactory demeanor" by the shadow. The mock jury's impression of Bleicher was that he was "effervescent and charged up," Vinson noted, adding he will "really have to analyze" the data on the Calcomp attorney.

Psychological Stress

The secrecy of its mission put "a tremendous burden psychologically" on the surrogate jury, the professor said. The understanding that their decision "could have some very important consequences" added further pressure to their job.

Vinson spent two to three hours every night with the shadow jurors on the phone and believes this procedure provided them with some "psychological release" from such stress.

Put together on the eve of the trial and over a weekend, the surrogate jury was intended "to be an experiment in how people make decisions in complex decision-making environments, Vinson stated.

Jury Found Favoring Calcomp At Time Judge Dismissed Case

(Continued from Page 1)

suspicious, the corporation "just did too many things at the same time" to be totally blameless for the strife within the plug-compatible peripherals market. She said she would have decided the case based on that market.

Others found IBM's market share bothersome. "IBM is so large and Calcomp so small," one said. "And what's $102 million in damages to IBM?"

On the other hand, two jurors said they were aware that other companies had suits pending against the mainframer. One suggested a win for Calcomp would be comparable to **"Willie Mays hitting a home run with the bases loaded."**.

'The Little Guy'

The view of Calcomp as "the little guy" was a result, in part, of the jury's perception of the company's attorney. Despite the presence of the two members of his firm who accompanied him to court nearly every day, Maxwell M. Bleicher seemed to stand all by himself against the attorneys and researchers for IBM, several jurors said. They liked Bleicher and wanted to see him cross-examine IBM's witnesses, they added.

"Nobody disputed that IBM is a good company," one member of the jury remarked. "IBM has dependability and reliability in its favor — even Calcomp's witnesses said so," another noted.

One juror felt Calcomp suffered from the poor economic climate in the U.S. during 1970-71 and was trying to blame IBM for this. She also surprised some IBM attorneys at a luncheon the corporation gave for the jurors following their dismissal by asking about "some action against IBM by the government in the 1950s" — the 1956 Consent Decree.

The jury had its favorite witnesses. If they have anything to say about it, Max Palevsky, founder of Scientific Data Systems, which he sold to Xerox, will never get bad press.

In addition to admiring his decision to sell when he did, one juror appreciated the fact that Palevsky didn't act like the multimillionaire he is.

Because he sold his chief interest in the computer industry, Palevsky was also considered more objective than other witnesses still in the business. Similarly, economist Gerald W. Brock from the University of Arizona was considered by jury members to be more credible because he had no vested interests in computers. Brock was viewed by the jury as one of the most honest people to take the stand.

So was Calcomp's chief executive officer, Lester Kilpatrick. They appreciated Kilpatrick's bias in the case and the fact that he did nothing to hide it. At times, however, they thought he tried to explain things too much.

One juror pointed out that Kilpatrick started out strong, but that six days on the stand, a cold and fatigue caused him to lose momentum: "I almost felt he thought he was losing the case a little more each day. By the end, he made many apologies and missed some questions, but I enjoyed him."

The one set of witnesses two jurors indicated they missed seeing were users of IBM and Calcomp equipment who would compare the devices, their capabilities and their maintenance needs.

Ranging in age from the early 20s to 65 plus and in occupations from an American Airlines clerk, a teacher, quality control inspectors and a window cleaner for Los Angeles to a custodian for a nearby school district and a carpenter for the state, the jurors had no previous experience with the technology involved in the industry and expressed some problem with this.

All appreciated the intensive first week of the trial in which the parties sought to explain the terminology and the functions of the various black boxes that make up the industry.

Two jurors suggested a "refresher course" on this information two to three weeks further into the case would have been helpful.

Some courtroom observers remarked that the jurors were often more alert than the attorneys in a trial that everyone acknowledged had its boring moments. Occasionally, a juror would fall asleep. But a few guarded against nodding off over a flip chart by sleeping for all or part of the daily two-hour lunch period.

Four jurors kept alert and on top of the complexities of the case by taking extensive notes. One man — a person several of the jurors would have chosen to be their foreman cross-referenced his notes.

The members of the jury in this case considered themselves a family by the time they were dismissed. At first many hadn't really wanted to go through with such a lengthy trial.

The jurors liked McNichols; they believed him to be fair.

While they did not doubt the judge's sincerity, some of the jurors questioned the consistency between his stated belief in the jury system and his decision to take the case out of their hands. Those who felt strongly in favor of Calcomp's case informed the IBM attorneys over lunch they felt the judge was wrong to toss out the case and hoped the appellate court to which Calcomp appealed the decision would reverse him.

Judge Tosses Out Calcomp Case

(Continued from Page 1)

conclude that IBM violated the antitrust laws in the "relevant markets," particularly in the early 1970s, and noted he didn't find it necessary to decide whether Calcomp had proved the existence of these markets.

If Calcomp had succeeded in showing him that IBM did violate Section II of the Sherman Antitrust Act, the judge suggested, he would have ignored the company's proof that IBM pricing actions damaged its disk drive business because that proof "bears dangerously on the brink of being speculative and tends to be weakly supportive" of the case as a whole.

McNichols' reluctance to end this trial, the first of the six private West Coast antitrust suits against IBM to reach court, came partially because of the months of time and energy it had already consumed.

The judge further indicated he is well aware that as long as "substantial, though conflicting, evidence" was presented, "the drastic termination of a case by a directed verdict is inappropriate."

This sort of judicial intervention "must be sparingly used in complex antitrust litigation where motive and intent play important roles," he added.

Calcomp will appeal McNichols' decision to the Ninth Circuit Court of Appeals, according to its attorneys. The company hopes the appeal will be decided soon, and McNichols has indicated he will ask that court to "expedite" the appeal.

"We think the judge's decision is right," IBM board chairman Frank T. Cary stated. "As we said in our brief, the Calcomp case is a virtual replay of the Telex case. We think there ought to be a limit to the number of times we have to relitigate those issues."

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WANG

I/O Interface Nears Status as Standard

(Continued from Page 1)

Board of Standards Review to assure all interested parties had a reasonable hearing, Hanrahan said.

Burroughs Corp., Control Data Corp., Digital Equipment Corp., Honeywell Information Systems, Inc., NCR Corp. and Univac all voted against the channel interface standard, as did two users groups — DECs Decus and IBM's Share. IBM approved the measure for public review but made no commitment to vote its approval during the final round, Hanrahan said.

The mainframers objected largely on claims that the interface was already obsolescent technology and would drastically inhibit the development of new computer architecture. Some said it would be too expensive to implement and might adversely affect the performance of many peripherals.

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Argument for Ending Calcomp Suit

Market Share Result of Product, Service Quality: IBM

By Edith Holmes
Of the CW Staff

LOS ANGELES — IBM attained its strong market position because of the excellence of its products and services, attorneys for the corporation argued in their successful bid to convince Judge Ray McNichols to dismiss the California Computer Products, Inc. vs. IBM antitrust suit.

But the phenomenon of IBM's market power rests on entry and growth, Calcomp attorney Max Blecher countered, reminding the judge of testimony that IBM held a 56.4% market share at its lowest point.

In arguing for IBM's motion for dismissal, the corporation's attorneys maintained that Calcomp failed to offer the jury a consistent market in which to determine monopolization.

Lead counsel David Boies of Cravath, Swaine & Moore also argued that Calcomp failed to offer the jury market share statistics which related directly to the markets it defined.

The excellence of IBM's products and services, its management, the training it provides its people and the technological advances it has sponsored are responsible for the corporation's market position, its attorneys contended.

Forced to Reduce Prices

Far from reaching its present stature by "unlawful acts," IBM "was forced to reduce its prices by the prices and products of plug-compatible manufacturers [PCM] and other competitors," Boies told McNichols. If IBM hadn't reduced its prices, it would have lost its position — as Calcomp Chairman Lester Kilpatrick wrote back in 1971, he pointed out.

Further, all of IBM's prices were profitable — and substantially so, he added.

"IBM's price reductions have not driven plug-compatible manufacturers out of the business. The PCMs have continued to grow. Calcomp continued to grow. Other PCMs have entered the business," Boies said.

Finally, there is no casual relationship between IBM's price reductions and specific Calcomp price reductions, the attorney maintained. Lacking these cause-and-effect proofs, damages are difficult to show, he suggested, adding that Calcomp's calculations of the damages to be awarded — $102 million — were purely speculative.

On behalf of Calcomp, Blecher argued that his client's duty to the jury was to present sufficient evidence from which it could decide just which markets were involved.

"What no one talked about . . . is the law in this circuit, and the law in this circuit is that anywhere between 60% and 70% is adequate to find monopoly, particularly where there is . . . a huge gap between the alleged monopolist and the remaining members of the industry," the Calcomp attorney said.

He reminded McNichols of testimony that IBM had a market share of 56.4% at its lowest point and that its nearest competitors — Univac and Honeywell — have no more than 9% to 11% of the general-purpose computer market.

IBM's own internal memos indicate it had 82% of something the corporation referred to as "the direct access storage device market" at year-end 1969, Blecher noted.

As long as the computer industry can supply substitute products on demand based upon customer needs, no monopolization of that industry exists, Boies had suggested. As an example of a lack of product substitutability, Blecher cited IBM efforts to alter the controller which initially interfaced products like the IBM 2314 disk drive with any CPU in an effort to lock out competition.

Entry and Growth

The phenomenon of IBM's market power rests on entry and growth, Blecher claimed. "I don't think there is any secret on this record that the entire industry has grown at an annual rate of 15% compounded. But the underlying difficulty is that growth is not profit. Revenue is not profit," he said.

IBM's capital provided the momentum for the power it wielded in the plug-compatible markets, he suggested.

Blecher stressed the importance of focusing on IBM's alleged monopoly profits. Citing initial IBM disk drive profits of 40% and 50%, he said, "that's exorbitant profit levels in American history in a competitive industry."

Schaefer Countersued; Conspiracy Charged

NEW YORK — Electronic Data Systems Corp. (EDS) has filed a $19.3 million counterclaim against the F&M Schaefer Brewing Co. charging the brewery with conspiring to defraud and deceive the facilities management firm.

EDS has also filed a motion seeking the immediate return of the system used by Schaefer, including software, as well as a permanent injunction enjoining Schaefer from using the system and from disclosing to third parties information on its design and operation.

Schaefer responded to the counterclaim by filing a motion to dismiss several of the items in the counterclaim.

A hearing is set for Saturday, Feb. 26 in federal court here in Foley Square.

The original suit by Schaefer, which seeks $115 million in damages, charges EDS with gross and wanton negligence and breach of contract in a facilities management and software development agreement between the two firms.

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Study Warns IRS System May Pose Threat to Privacy

(Continued from Page 1)

draft noted.

"Since TAS is proposed at a time of intense public concern over the potential abuse of the information resources of government and the private sector, the system could be perceived as posing a threat to civil liberties, privacy and the due process rights of taxpayers," the draft warned.

However, the thrust of the 148-page OTA report was its charge that the IRS did not provide enough specific and substantive information on the public record to support judgments on these essential aspects of the proposed system.

The IRS is reported to have supplied a scant 50-page proposal of the TAS with clarifying charts.

The TAS would require relocating centralized national tax account master files presently on tape at the National Computer Center in Martinsburg, W. Va., to the 10 existing IRS service centers across the country, the IRS explained. Each center would have on-line access to five years of records on taxpayers residing in their service areas, it added.

The present IRS system allows sequential access to 90% of all taxpayers' returns for a three-year period. The remaining 10% — problem cases — are on-line for immediate retrieval, but only from the master files at the National Computer Center.

IRS projected TAS would require 8,300 interactive CRT terminals and 750 line printers located primarily at regional centers and at IRS local field offices by 1985.

Under TAS, the regional service centers would communicate with field offices through the terminals by means of a data communications subsystem using dedicated, leased data lines supplied by AT&T.

The National Computer Center would be converted to the National Communications center, and serve as a centralized account directory and control point for intercenter activity. It would control the exchange of taxpayer accounts on a batch transmission basis by encrypted data channels or in scrambled form, according to the OTA draft.

Because of the dispersion and greater availability of taxpayer data, combined with a possible longer file retention time and on-line transmission, the IRS should submit a more detailed proposal to Congress, OTA said.

The proposal should include a better description of any safeguards for privacy and security that would be built into the system, the report stressed.

The issues central to the implementation of the TAS which remain unaddressed by the IRS involve the kind of information contained in the system, its use by IRS employees, TAS operation and IRS accountability for what happens to that information, OTA said.

"Until the specific scope of files and contents of TAS are spelled out, operations cannot be effectively monitored or dealt with by the executive branch, Congress, judges or parties in data-connected tax-law disputes," the report stated.

"Without the basic ground rules in the future it may be impossible to determine the extent of the adherence of TAS and its users to public expectation of government performance and to the demands of new laws such as the Privacy Act of 1974, the Freedom of Information laws, the tax return confidentiality provisions of the new Tax Reform law and new information requirements of tax programs.

"In view of the long planning time required [for TAS implementation] and for TAS intractability to change if safeguards prove faulty, there is a need to assure at the outset that the policy and technical dimensions are joined," the report said.

Although a formal report was to have been issued earlier this month, OTA took the report presentation off its agenda, postponing it until Feb. 24, a source said.

There is a possibility the OTA formal report may not be issued at all because of conflict of interest over its controversial nature, the source said.

The recent changeover of congressional committee chairmen in the new Congress is further complicating matters concerning a formal report, other sources said.

If the report is not formally issued, the TAS proposal could be sent to other congressional agencies and committees which do not have experts sufficiently familiar with the operation and potential abuses of such a system, the sources indicated.

EFT: Boon or Boondoggle?

(Continued from Page 1)

ticles, subscribe to newsletters and talk to colleagues on the subject.

"Second, most banks should sponsor or participate in research projects on the subject," he said, noting "these should include both syndicated studies in market areas where other banks are operating various EFT services and studies of each bank's own unique market.

"Finally," he added, "some banks should implement various EFT components; but only after careful consideration of market position, corporate objectives, affordability, the local market and many other factors."

Weakened Argument

Before coming to this series of recommendations, Kramer reviewed the classic arguments for a nationwide EFT system, but then added a number of missed projections weakened those arguments substantially.

In particular, he said the slow pace toward EFT had forced banks into effectively coping with the continuing flood of paper checks. "Thus the argument that EFT is needed in order to handle paperwork volume has pretty much evaporated," he contended.

The argument that EFT will lead to cost savings for the banks has also suffered as banks and other involved organizations have begun to realize just how widespread equipment would have to be to be effective. "To implement a fully operational national EFT network," Kramer said, "it would be necessary to have a terminal at nearly every retail cash register."

Another factor "frequently overlooked" is the need for parallel operation of the new and old systems — "perhaps for many years" — until the paper system can be phased out, the researcher reminded the bankers.

All that might be acceptable, he acknowledged, if the public were really clamoring for the EFT-based services, "but most consumer surveys on this subject "produce fairly negative results." Even after services have been introduced, they tend to be "rejected by so large a fraction of the population, one must wonder whether any significant demand exists."

Then he threw in a question for which he said he had no answer: "What would happen to those who refuse to participate in an EFT network if it were implemented?"

He recited some test market results, which have been largely negative, but added that there is hope for the future. Direct deposit of Social Security payments is an "EFT success story," perhaps because the service serves a real need, he explained.

Further, he said, in some states as much as 10% of the workforce participates in direct payroll deposit programs.

The telephone transfer account, which permits the customer to keep funds in an interest-bearing savings account and transfer them to a checking account as needed, is another EFT service which offers a real benefit to the customer, Kramer said.

And the "much publicized" Hinky Dinky program has been very effective, he said. Sixty-five percent of the transactions at the supermarket take place when the First Federal Savings and Loan Association offices are closed, according to Kramer.

From Fort Federal's vantage point "transaction costs [handled through the Hinky Dinky units] are appreciably lower than at the thrift's conventional branches," he said.

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Transfer Both Funds, Securities

Commercial Bank Installs Full Electronic Link to 'Fed'

By John P. Hebert
Of the CW Staff

NEW YORK — A state-chartered bank here has become the first commercial bank to implement a fully automated link to a Fedgral Reserve bank for the transfer of funds and securities, the Federal Reserve said.

The $7.4-billion-deposit Irving Trust Co. began converting from its semiautomatic 150 bit/sec paper-tape/teletypewriter link with the Fedgral Reserve Bank of New York to a fully electronic link on Dec. 24, according to Bryan Walsh, Irving's vice-president of customer services.

The completion of this first phase — establishing a high-speed CPU link for electronic funds transfer (EFT) — enabled Irving to handle large-dollar transfers for corporate clients at 16 times the speed of the previous system.

Now, with the second phase finished, the bank can also electronically transfer the ownership of government securities — the treasury bills, government bonds and notes which government agencies issue — at 2,400 bit/sec.

The higher transmission speed provided by the new system permitted the bank to reduce from nine to two the number of dedicated lines it needs to communicate with the New York Federal Reserve bank, Walsh said.

But these were not the only advantages.

Irving will be able to expand the automated system and handle additional business with the same staff while, at the same time, reducing the "many errors" that slipped through the semi-automated reporting system, he said.

The bank now can monitor the funds transfers on an on-line, real-time basis to make better management decisions and eliminate errors before they are transmitted, Walsh claimed.

"Irving is in the dealer clearance business. There is a lot of cash flowing through the federal wires and we need to monitor its movement," he explained.

In addition, clerical transcription costs associated with the previous system have been significantly reduced, he said.

Terminal System

Irving is "an IBM shop" with 3277 CRTs for the on-line entry, verification and edit checks of funds and securities transfers, according to Walsh.

The information from these CRT terminals flows through an array of equipment at the Irving DP site before entering the communications lines to the N.Y. Federal Reserve.

First, IBM terminal controllers supervise the devices, allowing information to pass to an IBM 3705 multiplexer/communications controller for the terminal system, Walsh said.

From there, the electronic funds and securities are fed into Irving's 370/168 mainframes and on to the dedicated links through an IBM 7 acting as a front-end processor and buffer interfacing the "Fed's" computer systems, he said.

At the New York Federal Reserve bank, Burroughs mainframes handle the funds transfer load, but a spokesman there would not comment on other portions of the system.

The Federal Reserve System began transferring funds and securities between the 12 Federal Reserve banks, their 24 branches and the Culpepper, Va., clearinghouse in 1974. However, Irving is the first commercial member bank to implement a fully automated link, according to a Federal Reserve spokesman in Washington.

The transmission method employed by most of the member banks is manual or minicomputer-controlled M-37 teletypewriters with paper tape units made by Western Union, Inc. These technically fit the definition of EFT.

The Federal Reserve has been quietly encouraging its 5,792 member banks to implement the direct computer links because of their obvious benefits of speed and accuracy, he said.

The average value of one member bank's transactions with the Federal Reserve system is $2.5 million, he said.

In 1975, $31 trillion coursed over the Federal Reserve network, he said, adding the member banks essentially deal with large-dollar volume applications.

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Bank, Phone, Credit Records Target of Koch Privacy Bill

WASHINGTON, D.C. — Rep. Edward I. Koch (D-N.Y.) has introduced a bill aimed at ending abuses of individual privacy through the use of bank records, telephone toll records and credit records.

Dubbed H.R. 1985, the Protection of Private Records Act limits persons in the private sector as well as state and local governments in their access to such records.

During a recent special session in the House of Representatives on the subject of privacy, Koch said the bill was introduced in large part because companies such as AT&T have refused to protect such records from disclosure.

It was also introduced because of a Supreme Court decision in April 1976 which held that bank records were not confidential and individuals could not expect them to be kept confidential under existing law, a spokesman said.

During hearings held last year by the Privacy Protection Study Commission, of which Koch is a member, AT&T disclosed that "at least 75% to 80% of the customers whose records have been subpoenaed had not been notified of such a subpoena," Koch said on the House floor.

AT&T also said "it would not of its own volition improve its practices with respect to the privacy of its customers' records. Rather, AT&T suggested that Congress resolve the question of requiring prior notice to customers," Koch added.

Procedures for Access

If H.R. 1985 is passed, someone who wishes to access the records of an individual will have to do one of four things: obtain the individual's written consent to allow dissemination of his records; obtain an administrative subpoena that the individual could challenge; obtain a judicial subpoena with notice to the individual, except in cases where a criminal or civil investigation would be jeopardized; or obtain a court-authorized search warrant with notification to the individual.

H.R. 1985 is identical to H.R. 15657 introduced last year, according to Koch.

NSF Asks Congress to Increase Its Budget for Research Into DP

By Edith Holmes
Of the CW Staff

WASHINGTON, D.C. — The National Science Foundation (NSF) has designated computer science an area of basic research that deserves "special emphasis" in the coming fiscal year and has asked Congress to increase its budget for studies of this field by 1.5%.

If approved, the NSF request will provide $17 million for computer research in fiscal year 1978, which begins in October.

The foundation asked Congress for $15.8 million for work in this area in fiscal year 1977 and is currently operating with $15.5 million, an NSF spokesman said.

Dr. Richard C. Atkinson, acting director of the foundation, recently told the House Committee on Science and Technology that greater computational speed is "a great need" in the computer field. He spoke before the congressional committee in support of the NSF's 1978 budget requests.

In addition to research to increase computing speed, the funds allocated to computer science would be used to try to decrease signal transmission time through miniaturization of circuitry and to improve software design through mathematical research, Atkinson said.

Part of the 1.5% for computer research will go to expanded work on intelligence systems, the NSF spokesman noted.

One reason for stressing basic research in this next fiscal year is the "increasing obsolescence of research instrumentation and equipment," Atkinson told the science and technology committee.

'Real Growth' of 3%

Proposing a total program of $885 million, the NSF director said the budget "reflects the decision to press for real growth, after offsetting inflation, of 3% in total federal support of basic research."

The NSF "accounts for nearly 23% of total federal support from all sources, federal and nonfederal, for basic research," Atkinson stated. Industry alone cannot be expected to carry the basic research load necessary to maintain adequate national strength in various fields of science, he added.

Computer science was classed with molecular genetics, earthquake research, instrumentation, applied research, science education and international science as an example of areas that will receive special emphasis in the 1978 program.

Funds for computer research fall under NSF's Directorate for Mathematical and Physical Sciences and Engineering, the spokesman said. The foundation has asked for $249.2 million for this overall area in 1978, an increase of 11.3% over the $223.9 million with which the directorate is currently operating.

Driver Stopped by Police Arrested After NCIC 'Hits'

SCHENECTADY, N.Y. — When police officers here recently stopped a motorist for traffic violations, a driver's license number inquiry on the New York Statewide Police Information Network generated a wanted person inquiry that resulted in two "hits" on the National Crime Information Center (NCIC) system, according to the *NCIC Newsletter*.

The NCIC hits disclosed that the driver was wanted by the U.S. Postal Service in Massachusetts for forging stolen government checks and by the U.S. Secret Service in Connecticut for interstate flight to avoid prosecution.

The arrested person was remanded to the county jail to await extradition.

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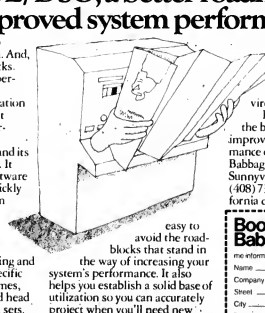

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Cardwell Says Staff Didn't Lie — SSA Needs More DP

By Edith Holmes
Of the CW Staff

WASHINGTON, D.C. — The commissioner of the Social Security Administration (SSA) has come to the defense of SSA staff members accused of "lying" about the agency's computer needs and "misquoting" utilization studies to make Congress believe the SSA must expand its DP operations.

The defense came in Commissioner James D. Cardwell's response to a Dec. 20 letter from Rep. Charles A. Vanik. (D-Ohio), chairman of the House Ways and Means Oversight Committee.

Vanik's letter suggested someone in the SSA was deliberately lying in order to persuade Cardwell and Congress that the administration's DP operation had to grow in equipment and space allocations [CW, Dec. 27-Jan. 3].

Cardwell reiterated his staff's conclusion that the SSA needs expanded DP facilities and denied the agency misquoted computer utilization studies that showed the SSA was making less than 50% effective use of its computer equipment.

Those studies were conducted by the General Accounting Office (GAO) and by an independent consulting firm using Boeing Computer Services, Inc.'s (BCS) Systems Analysis and Resource Accounting package.

No 'Innocent Victim'

"Your letter suggests that somehow I was the innocent victim of the SSA staff, who, by implication, have a less than full commitment to find the truth and do something about it," Cardwell said.

"Perhaps the better part of valor would be to let that impression stand, but I cannot. To do so would not only reflect on my competence, but on the goodwill and integrity of the SSA staff," he stated.

It was never the SSA's intention to discredit the GAO report; the administration has always viewed the study as "a useful indicator of possible underutilization," Cardwell said.

"I agree that several of the quotes in our Nov. 15, 1976 letter to you did not render properly the exact wording of the Boeing Computer Services report.

"I can assure you that this was inadvertent and was not intended to 'mislead,' Cardwell wrote, adding the full BCS report was sent to Vanik along with the letter.

"While you may disagree with my view of the matter, I do not believe that omissions or variations in the quotations are so material as to change the conclusions which should be drawn from the BCS report," he said.

The conclusions the commissioner drew were that the BCS review provided a basis for saying no substantial conclusions should be drawn from the data presented by the GAO.

In addition, Cardwell maintained "a great deal more work needs to be done — beyond that performed by either [BCS] or GAO" before an accurate representation of SSA's use of its computer resources can be seen.

Cardwell sought to assure Vanik and his subcommittee that the SSA is making "a substantial effort to examine and improve its management and utilization of computer and related resources" in the wake of the GAO and BCS reports.

The administration has contracted with the Mitre Corp. to conduct a 15-month study of SSA's current utilization practices and with Dr. Herbert Maisel of Georgetown University to develop the agency's staff, the commissioner noted.

With the completion of the work by Mitre and Maisel, the SSA hopes to eliminate some of its IBM 360 processors, Cardwell stated.

Earlier plans to acquire more large-scale CPUs are also waiting for the conclusions of the Mitre study — conclusions expected by this fall.

Peripheral Equipment Plans

The SSA will, however, obtain "certain peripheral equipment" during fiscal years 1977 and 1978, the commissioner added.

Valued at $5.95 million, this equipment includes mass storage devices for master file searching, disk replacement and enhancement for SSA's telecommunications processing complex, an optical character recognition scanner, a computer network facility for sharing operational control data, a disk for an employer index, a disk to aid in SSA's move away from tape sorting and front-end communications processors, he stated.

The peripheral equipment will be installed in the agency's present facility for less than $10,000, Cardwell said. Large DP devices scheduled to be purchased in fiscal year 1979 will go into the new $73 million computer facility now under construction and expected to be completed by the end of 1979.

Whether the House Ways and Means Oversight Subcommittee takes any further action now that the ball is once again in its court depends on its new chairman, Rep. Sam Gibbons (D-Fla.)

In the meantime, the subcommittee has sent its correspondence with Cardwell to the House and Senate Appropriations Committee in an effort to block any SSA attempts to acquire more DP equipment until the agency is shown to be using more than 50% of what it has now, a subcommittee spokesman said.

Upkeep Fees Added To Calif. No-Bid Suit

CONCORD, Calif. — A taxpayers' class action suit charging the public school district here with illegally acquiring an IBM computer system was amended recently to include charges of an illegal system maintenance contract.

Initially scheduled for a Jan. 17 hearing, the suit charged school officials obtained an IBM 370/125 to replace an IBM 1401 without competitive bidding and with district funds raised for another purpose [CW, July 17, 1974; Nov. 22, 1976].

The amendment increased the $565,229 system cost the taxpayer-plaintiffs want to recover by about $48,000, the amount paid for system maintenance since its installation in early 1974, according to Stuart A. Safine, attorney for the plaintiffs.

At a pretrial conference held early this month, the motion to amend the case was granted and an IBM in-house counsel was present for the first time at the legal proceedings, Safine said.

Up to that point, the case had been handled by a San Francisco law firm without IBM interference, he added.

Smith vs. the Mt. Diablo Unified School District is scheduled to be heard on April 4.

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Automation Stymieing Swedish Citizen's Right to Know

By Mark Murray
Special to Computerworld

MARIEFRED, Sweden — In theory, the Swedish citizen's traditional "right to know" is preserved and possibly enhanced by the computer.

In actual practice, however, it doesn't seem to work out that way.

Historically, all personal, commercial and governmental records are kept in central agencies, classified as public information and available to any person who cares to examine or copy them.

There are, of course, exceptions in such matters as national security, foreign affairs, economic rights and personal matters.

This right is specifically defined in constitutional law to permit the citizen to keep informed on the activities of governmental authorities and thus to make government more responsive to the rights and needs of the average individual.

In the past, the records were kept on paper; although it may have been a difficult job getting through the voluminous detail, everything was there in plain Swedish for any person willing to go to the trouble to get it.

With the advent of the computer, however, the efficiency-conscious Swedes took little time in automating these massive files and magnetic tape was substituted for the tons of paper previously used.

Stored documents are now indexed in 20,000 registers distributed throughout Sweden and access is available to any citizen through terminals located in various public installations.

Expertise Necessary

However, a program is required to access the information desired and someone with some degree of technical expertise is needed to interpret the data. In spite of the fact that a Computer Inspection Committee and special computer laws have been created to protect the citizen's rights in this matter, the average citizen finds it much more difficult now to exercise those rights.

According to *Expressen*, a major Swedish newspaper, reporter K.G. Michanek wanted to examine a government report on media coverage of recent Swedish elections with a view to determining the amount of coverage and publicity received by each political party.

Instead of going to a paper binder and thumbing through it, as in the past, he now had to approach the custodian of the appropriate data base, the State Scientific Institute at Gothenburg University.

After weeks of discussion and a lengthy exchange of correspondence, he finally received the information he requested — in the form of a four-pound printout containing 800,000 statistical abstracts. Although there were written instructions for analyzing the maze of numbers, there was no understandable text and Michanek was unable to translate the data.

He sought technical assistance from the DP departments of three large organizations — Dagens Nyheter-Expressen, a newspaper publishing company, Skandia Corp., a transportation company, and the State Computer Inspection Committee.

Summarized, their comments were roughly as follows:

"It is technically possible to translate this data to readable text, but it will take weeks for our DP people and we don't have the personnel to spare for the work.

"Also, since we lack the basic parameters and didn't do the programming, we couldn't guarantee the accuracy of the results."

The expert from the State Computer Inspection Committee added: "I consider it scandalous that a state authority would give out public material in this manner. Their methods are probably not illegal but I think it should be brought to public attention as proof of the possibility of legally frustrating the public's right to know."

Michanek finally resumed negotiations with the University of Gothenburg officials and asked them to supply a translation for the mass of numbers. Their answer:

"We can translate it but it will cost between $700 and $900 to convert the data base to understandable text."

The reporter objected to the charge but, with no alternative, agreed to pay it. He was then told there would be some delay in processing because of personnel shortages.

He finally received the finished document a little over a month later — 20 typewritten pages — and the cost was $781.00.

Michanek seems justified in concluding that the traditional Swedish right to know did not come into the Computer Age unscathed.

Seven tough problems in "On and how Tandem's "NonStop"™

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2. System Down—Disc Failure.
3. System Down—Repairing Hardware.
4. System Down—Restoring Data Base.
5. System Down—Software Failure.
6. System Down—Changing to a Larger Processor.

Lots of things change when you go "on-line." Mostly for the better. That's why this is the most important trend in data processing today. But the one area which concerns management the most is "What happens when the computer goes down?" It's a good question, and until Tandem introduced "NonStop" processing last year the answers weren't pleasant. Service is interrupted; that's bad enough. But there is worse news still. At the instant of failure, a transaction in process could be lost (or duplicated), a record being updated could be destroyed, or a pointer changed incorrectly could cause the loss of untold records. In short, loss of service is the surface cost. Loss of data base integrity is an even greater problem. Tandem's NonStop System, hardware and software, is the first top-down, designed-in solution to both these problems. To make it even better, we've designed it so it's easy to program, easy to expand, and easily the most efficient transaction processing system around.

1. System Down—Processor Failure. Every computer will fail sometime. The bigger they are, the more often they fail. Tandem has replaced bigness with a unique multiple processor architecture. Workloads are shared by the processors under control of Guardian, the only NonStop Multiple Processor Operating System available regardless of price class. When a component fails, Guardian automatically reassigns both processor and I/O resources to ensure that in-process tasks including file updates are completed correctly. You decide the priorities; Guardian does the work. And no interruption of your "on-line" workload occurs. Restart is virtually instantaneous.

2. System Down—Disc Failure. When one of your disc storage devices fails in the middle of a file update, unknown damage to the record, to record pointers, or to indices can occur. Enscribe, Tandem's NonStop Data Base Record Manager, ensures that the damaged record is restored; and, with our optional Mirror Volume duplicate file technique, that operation is continued using the back-up file. The back-up files are created automatically and are used by Enscribe to improve system response time. When the down disc is repaired so are its files, automatically, by Enscribe. You decide which volumes to back up; Enscribe maintains them, and no interruption of service occurs.

3. System Down—Repairing Hardware. With any system, a hardware failure must be repaired. But only with Tandem can the system keep operating, right through the failure and through the repair, too. Tandem's Customer Service Representative can remove and replace any failed module in your system without interrupting service. The operators at terminals and the programs in process are totally unaware of either the failure or the repair. And routine maintenance, too, is performed with the system fully operational. This is one more unusual feature of our system, but without it, no system can truly be called "NonStop."

4. System Down—Restoring Data Base. When a hardware failure occurs during file update in any "on-line" system which is not NonStop, there is every reason to question the integrity of the data base. Integrity of the data base is crucial. For this reason, elaborate procedures to maintain restart points and backup files are required in almost all "on-line" systems. Not with Tandem. Using Guardian and Enscribe, the Tandem NonStop System ensures that all transactions are completed correctly even if a processor, I/O channel, disc controller or disc drive fails during that transaction. Equally important, the system downtime normally required for "restore" and "restart" operations is eliminated.

5. System Down—Software Failure. System software crashes are an important source of downtime in ordinary on-line systems, but not in Tandem installations. Because all Tandem software is designed and tested to run in a multiple processor environment, it is also designed and tested for failure modes never considered in single processor systems software. Most important, the use of independent processors, each with its own memory, assures that a software failure in one processor cannot cause a failure in a second processor or contaminate the data or programs executing in that processor.

6. System Down—Changing to a Larger Processor. On-line systems tend to grow, and as they grow they change. New applications, more stations, improved service; all of these result in a need for bigger, faster processors. With Tandem's NonStop System you can actually add processors, add memory, and add peripherals without any re-programming whatsoever. Using Guardian, Enscribe, and Envoy, Tandem's Data Communications method, all user programs and all files are geographically independent. They have to be for NonStop operation. You can also write your programs using a powerful high-level compiler for a multiple processor environment as easily as for a single processor.

7. System Up—Confidence Down. When an "on-line" system is up, people come to rely on it. And because today's computers are reliable, people have come to rely on them quite heavily. Which makes it even worse when the system does go down, or the information it supplies is wrong. Confidence is severely damaged. And anyone who has tried manual back-up systems knows that they are not the answer. An automatic back-up, non-stop system is the answer. And Tandem has it.

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To Prevent 'Data Havens'

Common Market Seeking Common Privacy Policy

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BRUSSELS, Belgium — Prompted by a resolution from the European Parliament, legislation to create a blanket privacy policy in the nine Common Market countries is under way.

The resolution is an outgrowth of a growing concern in Europe that "data havens" will be created by design or through less than satisfactory standards adopted by any one of the member countries.

By imposing a community norm, a "free data zone" could be established among the nine member countries. Further, basic requirements could be set to govern transmissions to nonmember countries.

Survey Undertaken

The Commission of the European Communities conducted a survey of legislation on "protection of individual freedom in relation to DP" last year. Its results still are being evaluated, but at least two countries, Germany and Luxembourg, are already pressing for adoption of legally binding minimum standards for the community.

The possibilities for "harmonizing" national legislation — convincing each country to adopt largely parallel laws — seem impractical now because seven of the nine are well advanced in their legislation. However, under the Treaty of Rome, the Council of Ministers may impose communitywide directives.

Expect Legal Analysis

No fixed timetable has been set, but a legal analysis of the issue, setting out the methods of achieving such a standard, is expected this spring.

A second expert meeting took place in January with another scheduled for May. One participant observed after the recent meeting that "the countries are now realizing that domestic data protection is ineffective when data is processed outside their territory, so they want the community to impose a set of minimum rules as quickly as possible."

A review of the new German data protection act, legislative drafts before parliaments in Belgium, France, Luxembourg and The Netherlands and preliminary guidelines for statutes prepared in Denmark and the UK shows similarities because they:

- Apply to both public and private data banks.
- Limit coverage to automated data systems.
- Require registration of the existence and character of systems.
- Impose limitations on the length of time data can be retained.
- Regulate secondary use, sharing and dissemination of data.
- Establish a national control authority.
- Attach responsibility for security and confidentiality of records.
- Apply sanctions for misuse of data.

Only Italy and Ireland are just initiating studies into possible legislation on privacy protection.

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Photo and schematic show three processor modules with space for fourth module, interconnected to disc controllers, tape controllers and communications controllers.

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Speeds up to 19.2Kb asynchronous and 56Kb synchronous.

Encryption Topic Of HIS Seminar

PHOENIX — New federal data encryption standards will be among the topics covered at Honeywell Information Systems, Inc.'s third annual Computer Security and Privacy Symposium scheduled for April 19-20 here.

Those scheduled to make presentations include Dr. Willis Ware of the Rand Corp., a member of the Privacy Protection Study Commission; Dr. Eldred Nelson, TRW Systems director of technology planning and research; Jack L. Osborn, director of Purdue University's Privacy Project; and Dr. Robert Goldstein, author of *The Cost of Privacy*.

Network Emphasis

New directions in information privacy as well as site-planning requirements for secure DP installations will be examined, and special emphasis will be placed on network and distributed data communications security.

The registration fee is $350. Further information is available from Jerome Lobel, HIS manager of computer security, P.O. Box 6000, Phoenix, Ariz. 85005.

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DP Games Teaching Collegians About Environmental Trade-Offs

EAST LANSING, Mich — Students at five colleges and universities in the U.S. and one in Germany are using computer-based games to learn about environmental trade-offs.

Designed by two Michigan State University (MSU) professors here, the games are based on actual environmental data and relevant MSU research, according to an MSU spokesman.

A student who spends two to three hours in 30-minute segments on each game comes away with increased knowledge of alternatives in allocating energy, managing water quality, operating farms and feedlots and controlling agricultural pests, he said.

Ronald C. Rosenberg, professor of mechanical engineering, and Frederick T. Fink, assistant professor of engineering instructional services, use their games in an interdisciplinary environmental systems course they teach each fall. The water quality game also is used regularly in a civil engineering course.

All games may be used by other MSU students who have access to the computer through terminals in various MSU campus buildings.

To play "Waquaq," the game on water quality, the student can elect to be a manager of a municipal water plant, a government agent in charge of compliance with pollution standards or the owner of a bathing beach downstream from the plant. He can add in a "clean-up" tax and work out water quality management according to different seasons of the year.

Data for Waquaq came from that obtained for the Red Cedar River in East Lansing and from research done on waste-carrying capacities of similar streams in Illinois.

'Dispatch' and 'Popdyn'

A student playing "Dispatch" has to work out a financially feasible arrangement for providing power from four generators to meet daily demand for a typical Michigan community. The game is partially based on operations of the Michigan Electric Power Pool Control Center near Ann Arbor, which monitors demand and supply of power in the state and in five nearby states, and a Canadian province.

"With this game," Rosenberg said, "the students learn the complexity of just turning on a light bulb. They have to work out ratios between energy supply and demand and dollar costs, without overloading or underloading the powerlines.

"The student who underloads the lines and causes a blackout hears about it from the computer. A bell rings and the computer signs off."

"Popdyn" deals with the population dynamics of cereal leaf beetles, which attack grain crops and which can be controlled by chemicals and the use of wasp parasites.

A student playing the game, Fink said, has a goal of keeping the beetle population at the lowest possible level by economically managing crop plantings and chemical and parasite levels over time. Many students "go broke" in eight to ten years, although it is possible but difficult to last for 50 years as the game is devised.

How to get your own free ticket to COMPUTER EXPO 77

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2. Circle the city and dates most convenient to you:
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Cleveland Convention Center—April 19–21
Minneapolis/St. Paul, St. Paul Civic Center —April 26–28
Chicago, McCormick Place—May 3–5.
New York Coliseum—May 10–12
Philadelphia Convention Center—May 24–26
Washington, DC, Sheraton Park Hotel —May 31– June 2
Boston, Northeast Trade Center (Rte 128, exit 39) —June 7–9

3. Circle those dates on your business calendar.
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ENROLL: *Case Study User Forums** will be conducted in all nine cities by leading users and independent consultants. Topics are: Applying Minicomputers (Tuesday) • Managing Terminal Networks (Wednesday) • Improving Software Productivity (Thursday)

NOTE: *Computer Designer Forums** will also be available in San Francisco, Los Angeles, Chicago, New York and Boston. Topics include: Evaluating and Using Microprocessors • Evaluating Peripherals for Mini- and Microcomputers • Evaluating Memory and Storage Devices

* The Forums are held in conjunction with COMPUTER EXPO and require separate registration and fees. They are held each day from 9 AM to 1 PM. One day's admission fee is only $45; additional days are $35. Advance registration is recommended. Call (800) 225-3080 to reserve your space and get complete registration materials.

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Mini-Driven Exhibit Based on Immigration

PHILADELPHIA — Visitors to the Balch Institute here are increasing their awareness of various ethnic contributions to the American way of life through an "Electronic Kaleidoscope" exhibit powered by a minicomputer.

By using any of eight CRTs available, visitors can retrieve information on the immigration process, such as where and why people settled in America, according to program director Philip Mooney.

The CRTs also offer multiple-choice tests on various other subjects such as food, he said. This is very popular with schoolchildren because it lets them know instantly if their answer was either right or wrong and, if wrong, what the correct answer was.

"It helps the kids recognize that what they see as American has roots in other cultures," Mooney said.

A psychological test administered via the CRT gives visitors an understanding of what it is like to choose to emigrate to another land, he added.

The Balch Institute staff formulated the questions and answers for the kaleidoscope, and Logic Data Systems, Inc. (LDS) of Cherry Hill, N.J., put the system together using a 620 L mini from Varian Data Systems, Diablo disks and CRTs of its own manufacture, according to John Viti, president of LDS.

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As Complex Lawsuits Multiply

DP-Based Litigation Systems Briefing Legal Teams

By Ann Dooley
Of the CW Staff

GERMANTOWN, Md. — As the number and complexity of major lawsuits increase, litigation teams are bringing computers into their corner.

Aspen Systems Corp., a subsidiary of American Can Co., assists lawyers with a specially designed, computerized litigation aid which can be accessed on-line to Aspen's facilities or installed as a turnkey system at client sites, according to Sperling Martin, vice-president of Aspen's Information Systems and Services Division.

Each case is given individual attention and a package is designed to fit the needs of each, he said.

Using Aspen's facilities or installed packages, lawyers can index the thousands or millions of pages of documents and depositions involved in complicated actions and instantly access them to retrieve key facts, Martin said.

They can also query Aspen's data banks for court decisions or statutes pertinent to the case.

Aspen has developed text processing systems to produce indexes and directories and document retrieval systems to support the ongoing duties of a data base through on-line text editing and file management, Martin said.

Aspen equipment includes an IBM 360/158, owned and operated by American Can Co., CRTs, remote batch terminals and word processing stations, Martin said.

With a disk storage capacity of over one billion characters, Aspen can design and manage a data base of almost any size, he added.

Aspen has implemented a variety of packages, according to Martin. One is Quik-draft, which has been devised to provide on-line text editing for litigation and drafting of legislative bills.

Because many of the laws passed are amendments to already existing laws, a CRT operator using Quik-draft can call up an existing law and add to or replace it with the new law, he said.

Another package is Aspensearch, an interactive documentary retrieval system. Aspensearch V, the newest version, can be used to search and extract key facts from millions of pages of documents by a single word, phrase or word-context relationship, Martin said.

The system provides more economical use of computer time because search outputs can be stored, edited and reused, he noted. "With a portable terminal, lawyers can literally take their files to the trial site and within minutes retrieve information that could prove pivotal in cross-examining a witness," according to Herbert Brinberg, Aspen chairman. Access is by dial-up or leased lines.

The system operates on either video or hard-copy terminals, and a single installation will support a number of different document data bases, Brinberg said.

Printouts or displays can be specified according to sequence or number of text lines desired and output may be on-line or batch processing in a wide variety of formats, he said.

Basic Software Repertoire

Aspen has developed documenting and text processing for specific applications such as bill drafting or litigation using an index system. "We have a basic repertoire of very flexible software and we can combine them in any way to fit a specific application," Martin said.

Once the necessary data has been determined, document selection is organized and guidelines for coding and processing are established.

Next, the document processor is keyboarded to machine readable form. It is then created, edited, checked and loaded into the system geared for the user's informational needs, according to Martin.

With terminals in a law office, clerks can key directly into the data base and, at the same time, search and probe files, Martin said.

The system can also provide documents and support for ongoing products and services. "Once the data base is activated, it is important to keep updating and maintaining it for use by attorneys," he said.

Information Management Problem

"One thing people really get confused about is that litigation is really an information management problem not a DP problem," Martin commented.

"The fact that you use DP tools to support litigation is only one part of the process," he said. "The key is how you establish the total system of people, equipment and programs to collect and implement raw information in a way to be useful and provide a gain in efficiency."

The computerized litigation industry accounted for $10 million in revenue in 1976, according to Brinberg, and it should keep growing, Martin added.

"That doesn't mean more companies, just expansion of services," Martin said.

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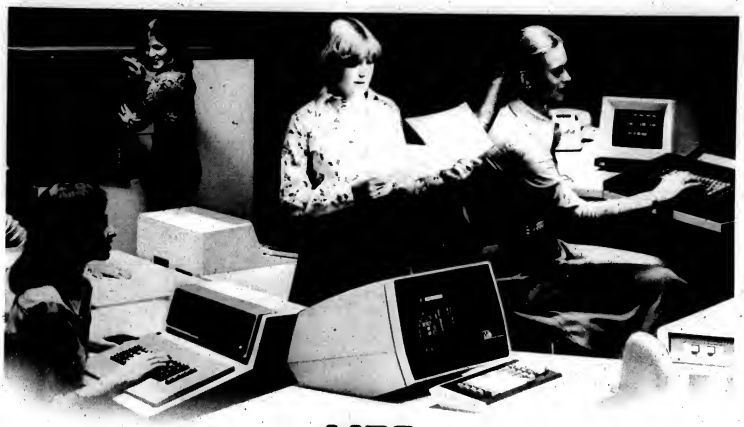

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Editorials

Too Tough to Handle?

After a slow start, the procompetition forces favoring an open entry approach to telecommunications are mustering their strength in Congress.

A resolution is imminent that will support the competitive policies of the Federal Communications Commission (FCC) [CW, Feb. 14]. In addition, the reintroduced version of the Consumer Communications Reform Act has gained supporters very slowly.

It is still hard to believe Congress could overwhelmingly support a bill that would severely restrict competition and has virtually no tangible benefits for the telephone consumer.

Much of the congressional support last year was undoubtedly based on the personal visits which Bell System executives made to all members of Congress. But it now appears doubtful the Reform Act will again gain the backing of 175 House members.

The resolution backing competition will not have the force of law. But it may undergo the legislative hearing process. If that happens, the supporters of FCC policies will be in the forefront with their comments.

It is still too early to predict the final outcome of the concerted AT&T push to reaffirm its monopoly through the legislative process. But the procompetition forces seem to be getting their positions before the Congress.

A debate certainly should be held on the future of competition in telecommunications.

It is encouraging to see that the many millions spent by the Bell System in pushing this legislation has not been able to overwhelm Congress into blind passage of legislation that requires some very careful consideration to protect the well-being of a vital industry.

Some Washington observers now feel the end result of this debate will be some form of limitation on the present operations of the Bell System.

If that happens, AT&T may wonder in retrospect whether the Consumer Communications Reform Act turned into a tiger which became too tough to handle.

Constructive First Step

Now that Griffin Bell has been confirmed as U.S. Attorney General, his actions on antitrust matters will be watched carefully.

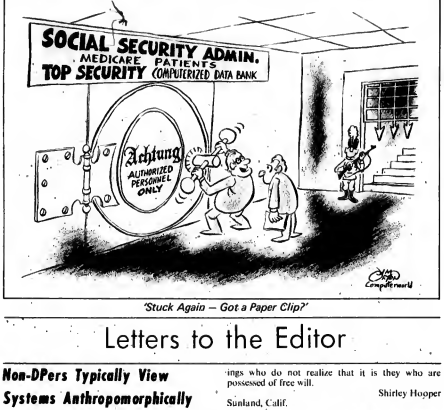
In this regard, Bell's decision to keep Donald Baker in the important post of Assistant Attorney General of the Antitrust Division at the Justice Department is important.

There had been valid questions on whether Bell would attempt to interfere with the Justice Department antitrust suit against IBM since he is a partner in an Atlanta law firm that does legal work for the company.

Baker has been involved with both the IBM and AT&T antitrust suits. He has demonstrated, in various speeches before industry groups and at congressional hearings, that he has no intention of allowing Justice Department cases to become political vehicles.

Baker is a professional who believes the law must be enforced regardless of where the chips may fall. He is a necessary asset to the Antitrust Division.

Bell has taken a constructive first step toward his pledge that he will not allow personal involvements to interfere with his duties as Attorney General.



'Stuck Again — Got a Paper Clip?'

Letters to the Editor

Non-DPers Typically View Systems Anthropomorphically

Beryl Simpson's reactions to American Airlines' Sabre system ["Memories of Sabre Not Fond for All," CW, Feb. 7] is typical of many (if not most) individuals who reside outside the world of DP — anthropomorphizing.

That she recalled her experiences with some degree of emotion indicated she was so mesmerized by Sabre she spent "three or four years" working with it, developing an ulcer for her efforts. There did not appear to be an understanding of the fact that her real foe was management, not the Sabre system — that she was in control, not "that stupid computer."

It is unfortunate when management neglects to introduce computerized systems as useful tools. However, still more unfortunate are those human beings who do not realize that it is they who are possessed of free will.

Shirley Hopper

Sunland, Calif.

Substantiative Evidence Lacking

The recent "Historical Perspective" on Griffin B. Bell ["Bell's Antitrust Decisions Tend to Favor 'Big Guys,'" CW, Jan. 31] was idiotic and misleading.

The writer gave no evidence whatever to substantiate his charges against Bell. His only evidence was that in a few cases the court decided in favor of the larger company. No evidence was presented which indicated that the verdict might have been different in another court or with another judge.

I have no quarrel about people writing garbage, but *Computerworld* should have some minimum standards for its writers.

Herbert A. Morris

Peoria, Ill.

Both Viewpoints Valid, Necessary

In his letter, Richard H. DuBois touched on a very sensitive and controversial subject ["'Consultative' Salesmen Have Built-In Bias for Own Vendor," CW, Jan. 31]. There are two opposing views on the subject of consultative selling when the people involved are the salesman and the consultant.

I agree the consultative salesman will have a natural bias for his product; nevertheless, he should be a professional — knowledgeable of his customer's problems and requirements if he is to have a satisfied customer base.

DuBois stated "a nonbiased and objective consultant offers the client his knowledge in system design based on the myriad of products available on the market." Because of the myriad of products available, it is my contention the consultant cannot be nonbiased and totally objective.

By the size and nature of the product offerings from the many manufacturers, the consultant's system design and hardware selections must be influenced by his past experience as well as the salespeople who call on and educate him.

In the long run, I believe both points of view are valid and necessary if the customer is to be the beneficiary.

David R. LeMieux

Palo Alto, Calif.

Data Past

Five Years Ago
Feb. 23, 1972

SAN FRANCISCO — IBM was restrained by a federal district court here from discontinuing maintenance on computer systems with extended core memories manufactured by Advanced Memory Systems, Inc.

— — —

SACRAMENTO, Calif. — Welfare recipients here obtained a preliminary injunction to prevent the state from using computers to break the law. The complaint, filed against Robert B. Carlson, head of the California Welfare Department, charged the department with illegally extracting information from computer files of unemployment insurance checks.

Eight Years Ago
Feb. 26, 1969

CHICAGO — A possibility of antitrust action against IBM, which might involve triple damages for hundreds of IBM computer installations, was revealed here by Illinois Attorney General William J. Scott. The suit was expected to be a class action, which meant that in addition to the 40 or so state computers, all the IBM computers at municipalities and universities in the state also would be covered.

— — —

WASHINGTON, D.C. — IBM suggested that special laws to protect computer programs should be passed which would carry penalties for unauthorized use or possession of registered programs, but which would allow anyone to make use of the fundamental concepts included in the program. The IBM report proposed a registration system to provide protection for the investment involved in creating a workable program rather than for the discovery of new concepts or principles.

Computerworld welcomes comments from its readers. Preference will be given to letters of 150 words or less. *Computerworld* reserves the right to edit letters for purposes of clarity and brevity. Letters should be addressed to: Editor, Computerworld, 797 Washington St., Newton, Mass. 02160.

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Survey Responses Show Diverse Views on Sex Bias

By Jack Stone
Special to Computerworld

The results are in and the analysis almost complete. The survey concerning the status of women on DP staffs [CW, Oct. 4] produced a large number of completed questionnaires and, almost as important, a broad range of commentary.

In this column, I present selections from many of these notes and letters, trying hard, believe me, to maintain a balanced set of viewpoints. If all goes well, the survey analysis will be published in my next column. My sincerest thanks to all who responded.

• "We are making progress within computer operations itself. There are seven males and eight females in the programmer/analyst category. Those hired within the past year include two males and three females. Up until this time, the predominance of persons on the eligible lists has been male."

• "I am the only male in a staff of six in operations. The one secretary I have is getting a better salary than the operators and to move her into DP would increase the budget. Of the company's five managers, only one is female.

"Training [of my operators] is my big problem as most of the women are married and do not want to leave town without their husbands for the one- or two-week seminars."

• "I am the only female in the programming department of 34 people. Surely there are more qualified women programmers in Southern California than only myself."

• "Let me sum up my views on the subject by paraphrasing a current ad: 'You've come a long way, baby!' [I've moved] from a programmer to the president of a successful software systems and service bureau business. I fought the battle [of being a woman] by building confidence in my customers for my company's dependability and product performance."

"It has not been an easy road. The rental agent requested that my husband (a physician) be named on the lease; I pointed out that this was an archaic practice and finally, won my point.

"The keypunch corporation insisted upon a cash bond deposit for the machine rental; they told me that they disliked renting keypunch equipment to women. Only after offering to pay cash in advance and sending a testimonial letter from my banker did I get my machine.

"As recently as five years ago, it was even difficult to join some professional societies. Not that the societies were not amenable to welcoming women — it was just difficult convincing my former employers (all male) that I could be more valuable after the DP manager training experience. But things (in the society area) are different today."

• "On [the subject of discrimination against women], I would like to make a comment. Women have the responsibility in society of raising children. In my opinion, they are doing a poor job of it in the U.S. I don't believe they will do any better in business.

"Women are also harder to work with and get along with than men. Right judgment in hiring should favor men.

• "I do not feel that this office could be accused, in the legal sense, of discrimination against women, but the fact remains that all of our management and programming positions are held by men. Despite the Affirmative Action rules by which we operate, however, the old attitudes toward women prevail.

"I have had to fight against the feelings of some of our staff [who insist] that I should perform the secretary's job when she is absent, simply because I am a woman.

The Human Connection

• "In reference to your question about the secretarial staff being a viable source of personnel for junior DP positions: An applicant's attitude and qualifications for a junior DP position is of more importance than sex or [his or her] current job."

• "We have had, in the past, women programmers and computer operators. They performed well, but left for various reasons.

"Secretaries are not a better source for women DP employees than any other position. Aptitude testing should be done with all potential employees, male and female, and the ones who come out on top should be selected for further training and education. I don't feel OJT is a proper way of training programmers or other highly technical DP positions.

"I don't believe in discrimination, but I don't feel competition should be eliminated just so you can have a 50/50 staff. Any DP organization should get the best people [they can], and if they wind up with a staff of all women, OK, or 80% men, OK. An organization should only strive for excellence in its people.

• "As Cunningham noted, the career path from skilled office worker to junior DP professional is an increasingly natural one.

"It seems to me that acquisition of word processing skills would definitely demonstrate the qualification of an individual for entry.

"On the more general subject of women in the DP environment, their acceptance there is no different from that in any other professional environment. That is, women are accepted in clerical and technical positions, but not in management positions."

• "The fact that discrimination of any kind towards anyone is now taboo relies on social forces and does not negate its psychological aspects. Hiring processes, whether they take place behind closed doors or not, will always call personal prejudices into play.

"The computer industry is a step ahead of many in offering career opportunities to women because of the time slot in which it's gained its momentum.

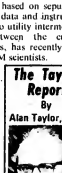
"People are learning to question all the 'old' modes of thought on the subject of differences between men and women, but what rates most important and qualifies for less social attention is the subject of human beings.

"Relate to me as a person first, a woman second and I'm sure we'll increase our communication potential by 100%. Life [is] difficult enough without people having to fight to be people. In my book, plain, simple equality — and respect for it — really count."

Four-State Data Base Eyed as Hardware Solution

The continued life of IBM 370 hardware in the data base era, based on separating storage into different data and instruction areas while adding two utility intermediate operating states between the current supervisor/user modes, has recently been suggested by some IBM scientists.

The Taylor Report
By
Alan Taylor, CDP



They see this as a potential solution to some of the problems in the data base era, where the danger of one user being able to interfere with other users' operations or to get where he shouldn't he has to be taken seriously.

The data/instruction extensions consist of using Bit 7 of the storage key (currently unused) and probably Bit 14 of the page-table entries. This would provide for identification of application programs vs. utility programs in one bit and data vs. instruction code in the second bit.

The hardware identification of the utility states between the supervisor- and user-application states uses the Program Status Word (PSW) bits 15 and 16 — with each of the current states taking one of the four combinations and the new states taking two (see accompanying box).

These divide out data base program utilities from library utilities provided by the supervisor.

One of the weaknesses of the current architecture is that the user must be allowed into the supervisor state to access supervisor utilities, even though once he is in, he cannot be stopped from jumping into areas where he should not be.

Under the suggested system, a user who wants to access one of the supervisor utilities would issue a Utility Call instruction and then go directly to the utility itself — not through the supervisor and without ever getting supervisor privileges with regard to what instructions can be issued.

Jumping between states is also changed, with only permitted entry and exit points allowed, as opposed to the current uncontrolled system.

When a jump from a lower program is needed (either by the Utility Call or Supervisor Call) a return jump is controlled by a transfer vector held in the extended PSW, which is brought into a hardware-accessible table at the time of the first jump.

This also provides for hardware identification of the state of the program before the jump occurred, thus enabling functional control to be enforced. Users under this system never issue Supervisor Calls, these being restricted to the utilities.

The restrictions in the use of data effectively reduce the application program to only read (but not modify) application program code while being able to have unrestricted access — reading, writing, modifying — as needed for data application data.

Similarly, utility programs can read their own code, but cannot modify it while being able to freely access their own data.

Neither utility code nor application code can access the other's data or code, although utility data can access the system data base freely.

What is particularly attractive about the proposal is that most of the program changes needed to operate the system in the modified form could be kept in the compilers.

The essential separation of data from instructions is already present in the PL/1 Optimizing compiler and would be possible to add to the Cobol and Fortran compilers.

The user has little to do, particularly if he is operating a single-language data base.

There are obviously a number of advantages of the system from a privacy point of view, and the use of hardware logic can certainly cut down on the overhead involved in security.

Particular advantages isolated by the IBM team include:

• Incomplete Validations. This occurs when performance reasons have prevented adequate or even any validation from occurring although it theoretically could have been performed.

Apparently such failure to use available protection has occurred for this reason "in many early (data base) systems" — an interesting point in itself.

• Wrong Validations. In the current state, the validation of jumps into the supervisor is complex and errors are occurring because the system is too large to test out.

Once an error has been located, it can be used for any reason by anyone who knows about it, thus leaving the system vulnerable.

• Validation Evasion. This occurs when the supervisor or some privileged program is entered any place other than the expected position.

This is the reason the authors are suggesting enforced protected entry points to be universally used for jumps between programs.

• Toctou Problem. The time of check to time of use (Toctou) problem occurs when some parameters are modified by a concurrent process after they have been validated, but before they have been used. This is particularly important where compiler time checking occurs as opposed to execution time checking.

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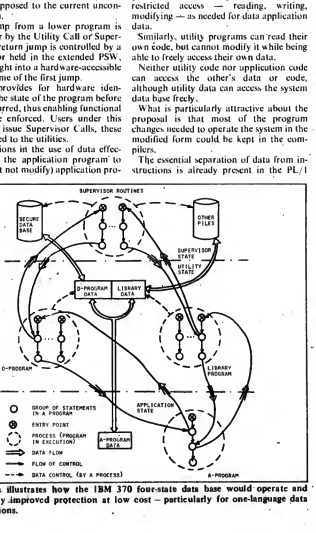

This diagram illustrates how the IBM 370 four-state data base would operate and permit greatly improved protection at low cost — particularly for one-language data base installations.

Consistency Seen as Soul of Clarity in Programming

Reader Commentary

By Lee Gruenfeld
Special to Computerworld

Recently, people in the DP community have been treated to a sparkling debate on the subject of programming style. We've had proposals, counterproposals, attacks, retreats, challenges . . . all the fun things from which some progress usually manages to emerge.

Unfortunately, as is so often the case in bitter controversy, the essence of the matter has been lost amid a sea of artificial dichotomies.

Even in *Computerworld*, we've seen heated arguments between those who advocate judicious use of IF . . . THEN . . . ELSE structures vs. those who denigrate the ELSE altogether.

Proponents of the heavy commenting school square off against the totally self-documenting camp. These examples are as endless as they are fruitless and misdirected.

What is gradually being realized is that there is precious little hard evidence to support claims of significant advantage of any particular style. Rather, that there is any style at all is the single greatest contributor to accuracy, correctness and ease of maintenance.

Internal inconsistency in any endeavor, in any field, is a classic psychological disrupter. Lack of structure and form severely hampers the ability to conceptualize clearly and to jump easily to key insights.

People have a remarkable capacity to function well in frameworks that hang together logically, no matter how irrelevant to the task at hand that logic may be.

Programming Style

In the (black) art of programming, selection of a style for a task can hinge on many factors. The "purist" preoccupation with the Bohm-Jacopini three-structure sufficiency proof fosters the notion that programs written with only those structures are somehow inherently better.

And yet mapmakers (to borrow a lesson from cartography) do not in any way feel constrained by the now-proven four-color map theorem to restrict their maps to only four colors. They have learned to take advantage of the rich, "superfluous" library of colors in order to enhance readability.

In spite of this, compiler-writers are now slinking around corners when it comes to implementing GOTOs in their languages, and this simple structure has assumed the welcome status of the plague.

In programming, style is dictated by a variety of factors; many a clever analyst has designed systems that are analogues of real-world situations. If a clerk used to walk a green work order over to the parts department, the program might "walk" a C3 transaction code to the "Parts Section."

While we can point to some fairly standard practices (single entry/exit, modular code, meaningful variable names) as being generally desirable, it might be a good idea to concentrate less on fighting for the supremacy of a particular method and, instead, understand that consistency is the soul of clarity.

We, in Tymshare Inc.'s Applications and Systems Consultant (Tasc) Group have experimented with a variety of styles and have had great success with all of them.

The degree of structure has had a more profound effect than the nature of any single standard.

Gruenfeld is manager of product development for Tymshare, Inc.'s Tasc Group.

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The Outside User — Part 2

RJE, Partnerships Can Be Options for Small Users

By Mal Stiefel
Special to Computerworld

A small user competes effectively with larger service bureaus by offering more personalized service and lower prices.

Therefore, he's bound to seek the least expensive hardware, and he's willing to endure some discomfort (i.e., a lower level of support by the seller) to get it.

What alternatives does he have? He can smoke out a higher priced seller, who will give more service.

In some areas, he may be able to find a customer-oriented service bureau to give him "raw" time, with operator support, as cheaply as anyone and without the headaches, if he can guarantee 20 hours a month or more.

A Viable Alternative

If utilization moves into the 30- to 40-hour per month range, he can seriously consider remote job entry (RJE). Industry observers note a strong trend toward RJE across the country among outside users.

Reader Commentary

In a typical RJE setup, the user has a more or less "intelligent" terminal at his own site, with a keyboard, card reader or other source data entry device, a mini CPU, a printer and data communications equipment.

Mass local-storage devices (cassette or reel tape units or disk) are optional. His programs and main files live on tape or disk at the central facility, waiting to be called.

The user enters his job control instructions, programs and file update information through his local terminal. Output reports are either transmitted directly back to the user's printer or printed at the central site and mailed to the user.

Pros and Cons

RJE has the obvious advantages of convenience, the lack of scheduling hang-ups and the availability of a more powerful central machine.

The price is a function of CPU time rather than wall-clock time, so the cost of operator inefficiencies is eliminated.

The total cost includes CPU time, telephone line charges, the cost of leasing and maintaining the terminal and the cost of materials (forms, in particular).

RJE has a drawback for the user who wants to maintain his own supervisor pack. Instead, he must use the latest release offered by the central facility.

However, a private (non-RJE) time seller will usually let the user keep his own copy of the system pack.

Partnership Trend

Still another observable trend today among the smaller users is the pooling of interests with other users or with a company that already owns a machine into a computing partnership.

In essence, the resulting organization is intended to serve the partners' own needs first and then sell time as a service bureau to the public.

In an arrangement where a small user joins with a time seller who is not primarily DP-oriented, both parties can benefit almost at once from the relationship.

The seller-partner has a guaranteed income, at least on paper, coming from the user-partner. He also has access to the systems design, analysis, programming and operations capability that the user-partner has developed.

The user-partner gains, perhaps, a substantial break in the hourly rate and priority in scheduling.

Business Stimulant

Also, such an arrangement can stimulate his business immediately, because the seller-partner can buy his support services rather than attempt to build an expensive in-house programming staff.

In fact, the user-partner may become the facility manager, hiring the seller-partner's DP staff and assuming total control of the machine.

In such a situation, there may not be a partnership per se. The "user" simply operates the facility under a contract with the "seller."

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You've spent a lot of time looking at data communications hardware, software and services. Everybody has. But now you've looked far enough. Whatever your requirements, you'll find Harris provides the remote batch terminals, remote communications processors, distributed processing systems, peripherals, maintenance and software support you need . . . for entry-level, medium- or high-function applications. Read on for a close look at Harris now. It's a sure way to make things look up for you!

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Harris has two product families designed to fill the needs of remote batch terminal users: the entry-level Harris 500 and the high-function Harris 1200. Both families are structured around powerful minicomputers, enabling you to configure the exact system you require for specific applications . . . choosing from families of proven peripherals. Data communication rates of up to 50K bps can be achieved. Maximum throughput rates are possible with full-duplex communications to central computers supported by a Harris communications controller.

Look at Harris Remote Communications Processors

The Harris 1600 family is designed for users needing expanded capabilities in remote communications and processing. Harris provides you with a transitional bridge to distributed processing functions via the Harris 1610 or 1620 remote batch systems.

You can begin with a Harris 1610 RBT supporting a line printer, card reader and optional card punch and go on from there to a Harris 1620 remote communications processor with multiple printers, tape drives and other peripherals supporting multiple concurrent emulation into as many as four mainframes *simultaneously*. This Harris innovation means you can access your in-house computer system, for example, at the same time you access an outside computer utility — from one 1600! It's made possible by the operating system designed into our advanced terminals.

Look at Harris Systems for Distributed Processing

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Harris Corporation is a half-billion dollar high-technology company operating worldwide to supply a broad range of equipment and services for the communications and information handling markets.

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For a more detailed look at what Harris can do for you, contact your local Harris sales office or Harris Corporation, Data Communications Division, 11262 Indian Trail, P.O. Box 44076, Dallas, Texas 75234, (214) 620-4400.

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There's more. Because it's small, our new ASR capability inserts easily into the base of all existing DECwriter IIs. It has its own power supply, EIA port and is compatible with modem and x-on/x-off protocol. And prices start at just $495 with the 4K version in lots of five.

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Developer's Benchmark Shows

Omsi Sort-1 Whips DEC Utility Used Under RSTS/E

By Don Leavitt
Of the CW Staff

PORTLAND, Ore. — Written in machine language for Digital Equipment Corp. PDP-11s under RSTS/E, Omsi Sort-1 performs up to 50 times faster than the sort written in Basic-Plus provided by DEC, according to the vendor, the Oregon Museum of Science and Industry.

The museum's sort is also able to handle far more records than the DEC software, a spokesman said. Omsi Sort-1 can work with files containing more than a million records, he stated, whereas a benchmark of the two utilities could not go up to 40,000 records because that volume was not permitted by the DEC sort.

The benchmark was conducted on the museum's PDP-11/45 under RSTS/E Version 6A swapping on an RK05 and using RK03s. According to the museum, 104K words of core memory plus Fabritek cache memory were used.

Omsi Sort-1 runs under Omsi-RT, the museum's RT-11 emulator, the spokesman added.

The museum used the 28K version of its sort and the results are shown in the accompanying chart. Though pleased by the results, the museum spokesman stressed the sort will be distributed in a 16K version which runs "about 10% slower" than the one used in the benchmark.

In another portion of the comparison, he stated with a 10,000-record file but changed key lengths. The 16-byte key results are shown in the chart; a 32-byte key required 17.7 sec of CPU time with Omsi Sort-1, but 565.5 sec with the DEC sort.

Sorting on a 64-byte key took 34.7 CPU sec with the museum's package and 627.1 sec with DEC's, the spokesman claimed.

Changing job size had little impact on runtimes, he added, noting the 16K version ran only 37.3 sec for the 10,000-record, 64-byte key sort that took 34.7 sec in the 28K job environment.

Omsi Sort-1 is compatible with the DEC Basic-Plus sort and supports chained or stand-alone operation. It runs under an unmodified RSTS/E Version 6B, the most current release of the DEC time-sharing software.

The 16K version of the sort can be acquired for $500 including operation and installation materials, he added from 4015 S.W. Canyon Road, Portland, Ore. 97221.

Record/File	CPU and (Wall Clock) Seconds	
	Omsi Sort-1 V01-1AX	DEC Sort V07-1A
5,000	4.5 (10)	238.1 (298)
10,000	9.5 (19)	510.8 (661)
20,000	22.1 (68)	1,126.2 (1,372)
40,000	45.6 (114)	Not Permitted

Test Results Using 16-Byte Keys

IBM Eases Terminal-Based Training

WHITE PLAINS, N.Y. — The Interactive Instructional System (IIS) announced by IBM enables 370 users in VS environments to create, execute and administer computer-based courses on existing terminal networks, the vendor said.

IIS provides users with support in three functional areas: course development, course utilization and administration, according to IBM.

It combines many features of two earlier IBM products — the Interactive Training System (ITS) and Coursewriter III — with an advantage not available in either, a spokesman claimed. This system differs from the earlier ones, he said, because it does not require a dedicated terminal. With ITS, a remote device may be used for normal DP business operations during part of the day and for training purposes the rest of the time.

IIS supports two methods of preparing course material. The Course Structuring Facility was designed to help people with no DP experience to develop and organize material for a course.

The facility includes simplified, fill-in-the-blanks worksheets for entering text, questions and exercises, using the English language, the spokesman said.

After the worksheet information is entered, IIS generates answer-processing and recordkeeping routines, he added.

The Coursewriter Language method leaves the more experienced writers free to determine specific instruction techniques. Language codes enable them to enter lines of text, ask questions, evaluate responses, provide remedial text for wrong answers and alter material in a complete course, he said.

The administrative portion of IIS generates various reports on course activity, student status and student comments for students, course authors, instructional staff and the training administrator.

Written in Assembler, IIS can be used under DOS/VS, OS/VS or VM/370. It operates as an application program under a variety of IBM data base/data communications programs and terminal access methods and supports IBM 3270 CRTs and "selected" hard-copy terminals.

IIS is expected to carry a monthly license fee of $450. Initial availability will range from the second quarter of 1977 through the first quarter of 1978 depending on the system control and communications programs involved, the vendor noted.

Package Enhances Disk Management

NEW YORK — The Dynam/D package for IBM DOS and DOS/VS users combines in a single system all the features needed for basic disk management, catalog management, device independence and shared direct access storage devices (DASD) support for multiple CPUs, according to the vendor, Computer Associates, Inc.

The package is said to correct the "most significant deficiencies" of DOS and DOS/VS installations and bring a "dramatic improvement" in system throughput and programmer productivity.

The software determines space available on a specified disk volume and dynamically allocates that space as a file is opened, not before the job is initiated. The package will also allocate additional disk space if the space originally requested isn't enough, a spokesman explained.

Full recovery is provided if disk space is not available, he added.

Dynam/D catalog management allows the user to control the physical attributes of the disk file. These can be defined or modified independent of JCL statements, he said.

Total file security can be assured by requiring a password whenever a file is to be accessed, he added.

Other programs with Dynam/D are said to provide disk utilization reports for data such as block sizes, record length and disk space allocated and used for each file. These reports also show the job that created the file and the job that last accessed it (along with the time and date of that access and CPU identification), he said.

Dynam/D also allows the user to modify the retention period of a file or delete the file from the volume table of contents (Vtoc). It also provides a sorted Vtoc listing, the vendor noted.

Dynam/D's support for device independence allows the user to take full advantage of new DASD devices as they become available without having to modify existing application programs, the spokesman added.

The package is available now for a one-time cost of $5,500. Other terms can be arranged, the company said from 655 Madison Ave., New York, N.Y. 10021.

'Insight' Aids DOS/VS Tuning

BROOKFIELD, Conn. — VS/Insight, now available from Universal Software, Inc. (USI), is a performance measurement package which provides the IBM 370 installation under DOS/VS with information for system evaluation and fine tuning, according to the company.

Reports produced by the monitor highlight system bottlenecks such as scheduling conflicts, operator inefficiencies, I/O device contention, partition lockouts and insufficient real storage usage, USI said.

VS/Insight develops its data from a constant monitoring of the DP operations rather than a time-dependent sampling. It is more than a job accounting system, providing more VS-oriented information than IBM's job accounting modules within DOS/VS, the vendor claimed.

The overall system performance is displayed in a series of graphs which cover activity, deactivation time, CPU usage and real storage usage, a spokesman noted.

Other information provided includes analyses of operator intervention, channel utilization and partition lockouts, he said.

Detail and summary reports reflect individual program efficiency by documenting virtual storage required, average real storage used, CPU time, deactivation time and paging time. Statistics on programs include fetch/load counts and number of page-ins, page-outs, page faults and copy blocks required, USI said.

VS/Insight works through a series of "hooks" set into the supervisor at runtime. It does not require any modification of IBM-provided software and operates with all DOS/VS releases.

The package is available on rental for $165/mo. USI added from Brookfield Office Park, Route 7, Brookfield, Conn. 06804.

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The VS version captures paging statistics and utilizes the POWER/VS Spooler accounting records to measure reader, printer and punch activity and provide turnaround and que time statistics.

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An optional performance analyzer program gives JASPER a "hardware monitor" capability that no other job accounting system can match. CPU, Paging and Device Activity are plotted by a graph generator in a series of "Activity vs Time" graphs that measure overall computer performance and spotlight over, and under utilized equipment.

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Changeable Flow Chart Symbols Ease Updates of Documentation

ORANGE, Calif. — Fickled Thinking Aids has announced a flowcharting "package" which includes a baseboard and a set of symbolic shapes on which users can write with a ballpoint pen and then press into place on the board to document logic flows.

As the logic changes, the user can peel off inappropriate symbols, erase the messages on them and rebuild the chart to reflect new thinking. The symbols may be used "as many times as you want," the vendor claimed.

Once a chart has been created on the baseboard — on which flow lines may be drawn to connect the symbols — it can be reproduced by using any office copy machine that accepts flat artwork.

The shapes in the package are three-quarter-size versions of the flowcharting symbols sanctioned by the American National Standards Institute (Ansi) X3.5 standard. These include I/O, process/annotation and decisions symbols as well as symbols for punched card, magnetic tape or punched paper tape.

Other symbols included are for off-line storage, connectors, documents, CRT displays and manual input. Drums, terminals, communication links, manual operations directly related to DP, auxiliary operations and preparation steps are also provided by the shapes in the package, the vendor said.

Baseboards range from 8-1/2- by 14 in. through three intermediate sizes to "specials" for classroom or group display, Fickled added.

A starter kit includes 10 of the small "legal-sized" baseboards and 320 symbols and sells for $8.95 plus $1 for postage.

Fickled can be reached through P.O. Box 6064, 990-M Enterprise St., Orange, Calif. 92667.

Plastic symbols have a peel for users.

On Rapidata Net

Time Series Analysis Improved

FAIRFIELD, N.J. — Described as a breakthrough in time series analysis and forecasting, the State Space Forecasting (SSF) Service is now available on the Rapidata, Inc. remote-computing network, according to a spokesman.

The service is equally applicable to forecasts of single or multiple time series and represents the first practical full-scale application of several theoretical developments in the area of control theory to time series analysis, he claimed.

Not Boxed In

SSF eliminates the time-consuming interaction and subjective judgment required by many forecasting techniques such as the autoregressive-moving average models pioneered by Box and Jenkins, he said.

The service provides many advanced capabilities, he added, pointing to the availability of a "unique Kalman Filter" for cause-and-effect forecasting which he said allows the preparation of simultaneous forecasts based on future estimated or budget values for selected variables.

Users can also choose various options for specifying output desired and the model structure. In addition to a selection of printed output, the forecasts, historical estimates and upper and lower 95% confidence bands are available as data for later analysis, Rapidata said.

Picking Portions

When appropriate, the user can specify development of a full autoregressive model in place of the more general SSF model. Further, at the user's option, the order of both the autoregressive and State Space portions of the model can be specified, the spokesman noted.

The cost of forecasts prepared using SSF is based on the computer resources used, Rapidata said from 20 New Dutch Lane, Fairfield, N.J. 07006.

ICP Directory Update Released

CARMEL, Ind. — Revised indexing of the products listed is perhaps the most notable feature of the January 1977 edition of the *ICP Software Directory*, according to its publisher, International Computer Programs, Inc. (ICP).

As in the past several years, the directory is made up of two separately bound softcover volumes, one with 360 pages focusing on DP management, the other (600 pages) on application packages.

In this, the 29th edition of the directory which started life as a quarterly publication, the alphabetic listing of vendors is cross-referenced to the products each one offers.

The main subject matter table of contents of each volume has been reworked to make it easier to use and to include more information about each general topic in order to simplify the reader's search for products that might be best suited to his needs.

Indexes at the end of each volume list products alphabetically with cross-references to page number for narrative descriptions and a pseudo-matrix showing CPUs supported and language used.

Separate indexes for products designed for "medium- and large-scale computer mainframes" and for "mini and small business computer systems" are provided, as are indexes for consulting and time-sharing services, the publisher noted.

The directory, reissued every six months, is available on a subscription basis for $100/year, ICP added from 1119 Keystone Way, Carmel, Ind. 46032.

8080 Octal Codes Listed

BLACKSBURG, Va. — The 8080 Octal Code Card from Tychon, Inc. is a pocket-sized, slide rule-like aid for programming and debugging software for Intel 8080-type microprocessors.

The card contains all the mnemonics and corresponding octal codes that apply regardless of the manufacturer of the 8080 processor, Tychon said.

In addition to listing the mnemonics, the card is color-coded to indicate which flags are affected during execution of the instructions.

The back is printed with an Ascii code chart for all 128 characters, plus the 8080 status word and register pair codes, a spokesman noted.

The 6.5- by 3-in. card costs $2.95. Quantity discounts start at 10 units and custom imprinting is also available.

Tychon can be reached through P.O. Box 242, Blacksburg, Va. 24060.

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'R&D/Tool' Halves Dollar Cost Of PL/I Compiles, Link-Edits

CAMBRIDGE, Mass. — Users of the low-cost R&D/Tool package from Odyssey Systems, Inc. are guaranteed the dollar cost related to PL/I compilations and link-edits will be at least 50% less than it would be using conventional program products supplied by IBM, a vendor spokesman said.

The only stipulation, he added, is that the user must supply the JCL procedure for the compiler with a good estimate of the number of cards in the source deck.

Unless that estimate is within 10% of the actual number, the Odyssey software won't be able to manage the operation well and the cost saving will suffer, the company explained.

R&D/Tool does not replace IBM's products; it works with them, the spokesman stated, adding versions of the software are available for use with any of the IBM-supplied OS- or OS/VS-oriented compilers and link-editors.

Large efficiencies are achieved during the compile and link-edit steps with "heavily reentrant CPU operations" and an interjob communicator, he explained.

Other characteristics of system operation with R&D/Tool include a reduction in the overhead needed for spooling support and other Hasp requirements.

Additionally, for VS installations, there is a cutback in VS mapping in support of I/O operations and an improvement in "parachor curves," according to Odyssey.

"Parachor curves" refer to a measure of the page replacement in a VS production environment processing two programs that are not reentrant, but which could have been if designed to be, the spokesman explained.

Odyssey indicated it built R&D/Tool originally for its own work when costs of a large-scale project were getting out of hand, but the scope of the application couldn't be curtailed. Instead, the efficiency of the program production process was attacked.

In the very first run of the software now called R&D/Tool, the company achieved a 48% dollar cost saving, the spokesman claimed. Since then, modifications make the 50% guaranteed savings completely reasonable, he added.

The package runs under OS/MFT or MVT, OS/VS1 or OS/VS2 as well as under the Time-Sharing Option (TSO) or the Virtual Machine facility (VM/370) and its CMS environment.

A perpetual license for R&D/Tool is now available for $1,985 from Odyssey at Suite 306, 4 Brattle St., Cambridge, Mass. 02138.

Vault Management In 'Epat' Update

BURLINGAME, Calif. — Release 2.2 of the Epat tape library management and control system from Software Design, Inc. (SDI) supports a separately priced facility the vendor calls vault location management.

Whereas Epat was developed to maintain control over a user's tapes within the active DP environment, the new feature maintains control over the physical movement of tapes between secure storage locations, according to SDI.

This is a task traditional tape library systems have failed to provide, the firm noted.

Vault location management is said to extend new levels of security to both on-site and off-site tape storage locations and to enable the user to transfer data tapes between locations at the appropriate time with absolute precision.

User-Defined Locations

With the feature, Epat computes which generations of data sets must be moved to successive tape vaults. Whenever the user wishes, Epat produces reports showing exactly what tape reels should be moved between each pair of user-defined vault locations, according to a spokesman.

Vault location management also produces inventory reports giving complete listings of all tapes that should be in each vault, SDI said. This should make it easy to ensure that proper security-transfer movements are taking place, the spokesman added.

Besides the main tape library, users may define as many as 25 other tape storage locations. Since different applications have different sensitivities and storage requirements, tapes — by application — may rotate in any direction through up to four vaults, the company said.

Designed for use under IBM DOS and DOS/VS, Epat can be rented for $295/mo. The vault location management feature costs an additional $45/mo. SDI said from 880 Mitten Rd., Burlingame, Calif. 94010.

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World rank as DP market: *Fourth*
1975 DP expenditures: *$2.7 Billion*
1975 imports from US: *$270 Million*
Rank as importer from US: *Third*
Computer Management is a monthly magazine recently purchased by *Computerworld, Inc.* Monthly circulation is 30,000

COMPUTERWOCHE
GERMANY
World rank as DP market: *Third*
1975 DP expenditures: *$3.7 Billion*
1975 imports from US: *$274 Million*
Rank as importer from US: *Second*
Computerwoche is a weekly tabloid newspaper started by *Computerworld, Inc.* It has a circulation of 21,000 to the West German computer community.

SHUKAN COMPUTER
JAPAN
World rank as DP market: *Second*
1975 DP expenditures: *$4.6 Billion*
1975 imports from US: *$189 Million*
Rank as importer from US: *Fifth*
Shukan is a weekly tabloid newspaper, jointly owned by *Computerworld* and Dempa publications. Circulation is 35,000

ZERO-UN INFORMATIQUE
FRANCE
World rank as DP market: *Fifth*
1975 DP expenditures: *$2.5 Billion*
1975 imports from US: *$233 Million*
Rank as importer from US: *Fourth*
Computerworld represents Zero-Un Informatique in the US. Zero-Un has three publications, one a weekly tabloid newspaper with circulation of 22,000, the second a monthly magazine, circulation 13,000 copies, and a new bi-weekly, Minis and Micros. All circulate throughout Europe's French speaking computer market

DATANEWS
BRAZIL
World rank as DP market: *12th*
1975 DP expenditures: *$250 Million*
1975 imports from US: *$60 Million*
Rank as importer from US: *(Est) 10th*
DataNews is a bi-weekly tabloid newspaper in Portuguese with an English-language summary. It is owned by *Computerworld, Inc* and has a circulation of 7,000

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COMPUTERWORLD
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Package Backs Complex Cross-Tabbing

SPRINGFIELD, Va. — An update of the Census Tabulation System Aid (Cents-Aid II) was described by a National Technical Information Service (NTIS) spokesman as a high-speed system enabling users to examine and display simple frequency counts of individual variables, as well as produce complex cross-tabulations with up to eight dimensions.

The system is said to have "virtually no limit" on the number of counts and tables that can be processed in a single run. It includes a retrieval language and a set of data transformation and recode capabilities that can be directed at any table or set of tables, according to NTIS.

The basic Cents-Aid arithmetic calculations do not permit many of the complex scientific analyses required by statisticians, economists, demographers and other analysts. It does, however, contain a basic statistical package that allows the generation of percentages, mean, median, variance, standard deviation and chi-square, the spokesman claimed.

Cents-Aid II is free from the constraints imposed by most programming languages, he said, adding data files do not have to be reformatted to be analyzed; any fixed-length format and all commonly used sequential file structures are allowed.

Hierarchical data files can be processed; the system can do inter-record analysis and more than one record type can occur at any level, he noted. All data on all levels of a hierarchy is available for classification, selection and computation, he added.

A computer-readable data base dictionary (DBD) can be prepared for any statistical data file. The DBD contains all the technically oriented information needed by the system, as well as descriptive labels for all variables contained in the file, NTIS said.

Cents-Aid II will format stubs, columns and headings using the descriptions from the DBD. The user has optional control over the appearance of tables, however, and can specify his own column and stub labels for each variable in a table, the spokesman noted.

Written in ANS Cobol, the package runs under either DOS or OS on IBM 360/370 CPUs. Used with OS/MVT on a 360/65, it needs a 150K region.

Distributed on either 7-or 9-track magnetic tape, the program is cataloged as PB 244 975 and costs $500 for North American users or $625 for foreign users. A user's manual can be ordered separately ($10 or $12.50 for foreign users) and that cost will be credited toward the cost of the package if it is bought later, NTIS said from 5285 Port Royal Road, Springfield, Va. 22161.

Dialog Prices Cut

PALO ALTO, Calif. — Lockheed Information Systems has reduced rates for users of its Dialog information retrieval service, according to a spokeswoman.

Discounts are now given to all users of the standard — "no minimum charge" — service. The discounts apply to Dialog use in excess of five hours a month.

In addition, prices have been reduced on two large data bases: the Chemical Abstracts Condensates now costs $35/connect hour and the Biosis Previews is $45/hour, she said.

Savings greater than those available under the discount plan are possible with individual password accounts with a minimum contract of $200/mo for six months. Group rates are also available to users who band together and contract for a guaranteed monthly minimum, she added.

Dialog can be accessed through the remote computing facilities of Tymnet or Telenet. Lockheed Information Systems is located at the Lockheed Missiles and Space Co., Palo Alto, Calif. 94088.

'Packages' Ease APL Overlays

TORONTO — Program overlays in APL have been simplified by the introduction of a new data type called a "package" on the I.P. Sharp Associates time-sharing service, network, according to a spokesman.

Using one of the packaging primitives developed for the data type, an APL user can combine "any" collection of APL programs and data arrays of "any size, shape or type," he said, adding all the APL "objects" named in an argument list, along with their names, can be stored in one package.

From then on, he continued, the package can be treated as a single object, even though it may contain many different programs or data arrays. In particular, a package can be put out on the system in a single WRITE operation and retrieved with a single read, he noted.

Almost every APL installation or user has had some local scheme for storing programs and data that can't be conveniently retained in the workspace, and in the past that has meant a separate record for each data array, he said. It also meant programs had to be converted to characters before being stored and reconverted when returned to the workspace.

With the packaging primitives, a single UNPACK restores to the workspace all the various programs on data arrays, complete with the names they had when the package was formed, Sharp claimed.

One package can be a member of another, the spokesman added. "They can be nested indefinitely," he said, and "we're only beginning to see the possibilities."

Despite the power and convenience packages offer the APL programmer, they can't be processed with most of the familiar APL primitives, he noted. "They are outside the domain of any of the functions of arithmetic and also of the usual array-handling functions of APL."

I.P. Sharp Associates supports its Sharp-APL service from 145 King St. West, Toronto, Canada M5H 1J8, and from 25 offices in Canada, the U.S. and in seven countries in Europe.

Cohen to Speak

AUSTIN, Texas — Leo Cohen, president of Performance Development Corp., will keynote the March 30-April 1 meeting of the Association of System 2000 Users for Technical Exchange (Astute) at the Joe C. Thompson Conference Center on the University of Texas campus here in Austin.

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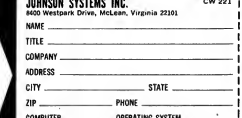

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WANG

Use of 'Trunks' Would Aid Programmer Productivity

By Richard J. Cichelli
And Martha J. Cichelli
Special to Computerworld

Having outlined the concepts of Goal-Directed Programming (GDP) last summer (CW, Aug. 2, 16 and 30), we have since developed the idea of skeletal GDPs, called trunks, as essentially reusable code sequences to increase programmer productivity even more than is possible with "conventional" structured programming.

Concepts and Techniques

GDP is a synthesis of the principles of top-down design and structured programming. Our previous articles showed how specifications formulated as "goals" could be transformed into assertions and finally into program conditional expression code.

GDP is a formalization of the problem reduction process applied to programming.

Bottom-up Modular Programming (Bump) was the first successful program design methodology. Adherents develop small functionally oriented procedures which are separately designed, coded, tested and finally integrated into larger systems.

The bottom-up approach has advantages and disadvantages. The idea of small, intellectually manageable code segments (modules) is especially valuable.

Layered Machines

The important thing that emerged from the Bump approach was the idea of layered machines. For scientific (Fortran) programmers, bump led to vast mathematical subroutine libraries.

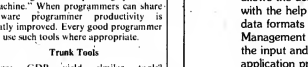
Business (Cobol) programmers now have a similar development occurring: the growing use of a data base management system (DBMS). Its interface routines provide the business programmer with a new "software machine."

For many applications, the DBMS "machine" is easier to utilize than the standard third generation operating system file "machine." When programmers can share software programmer productivity is greatly improved. Every good programmer will use such tools where appropriate.

Trunk Tools

Does GDP yield similar tools? Amazingly, the answer is yes. These tools are a new class of programmer aids. They share the unglamorous name of trunks. The name is derived from the name for the control flow diagram of any structured program — a tree-structure.

In the following diagram,



the letters represent modules (subroutines or sections) and the lines form the control hierarchy.

"A" is the root or main routine. It invokes "B" and "C." "C" invokes "D" and "E" "B," "D," and "E" are the leaves of the tree and are the most specific routines in the program.

Designing by GDP methods encourages us to design "A" first. It is the top-level routine and should probably be coded during its design.

Either "B" or "C" can be written next. After "C" has been written (and tested), "D" and "E" can be completed. This is what is meant by top-down development.

Mathematical software libraries were developed because scientific programmers needed the same operations (curve fitting, equation solving, etc.) and the same data types (e.g., real numbers) again and again. Thus the "leaves" of their programs were frequently the same.

Business programmers have a wide variety of data types (dates, amounts, names, etc.) with which to deal. Operations on them are typically simple and also very diverse. Because of this variety, few Cobol shops have large libraries of commonly used procedures.

Business programming consists of a very few main algorithms, however. Most batch systems are composed of the sequential file proof/edit, master file update and extract/report programs.

Just as scientific programmers share the leaves of their program trees, business programmers can share their trunks. These trunks are general purpose programs with some of the leaves left undefined.

Cobol Edit Programs

All proof/edit programs are basically the same. They read data records and produce transaction records and an audit list of the input with syntax errors flagged:

We have developed a trunk for Cobol edit programs. It has all the data declarations and logic prebuilt.

To make the edit trunk work for a particular application requires the creation of a table describing the application's data fields. (This table can be stored as an external file or it can be coded into the program.)

The table contains an entry for every data field in the system and describes its position in the original input record, its length, its data type, a heading for reporting purposes and a description of how the field is to be used in the update process.

Standard routines exist for checking the syntax of dates, numeric fields, required vs. optional fields, etc. Special types and their corresponding editing routines are easily inserted into the program tree. Appropriate error messages are associated with each syntax type.

Our master file update trunk follows the same design and uses the same table.

It is easy and worthwhile to develop a source library of trunks for business applications. Every shop which uses GDP will create such a library naturally.

Richard Cichelli is research manager for computer applications at the American Newspaper Publishers Association Research Institute. Martha Cichelli is a partner in Software Consulting Services in Allentown, Pa.

BCS Adds Office in Ohio

CLEVELAND — People in the Cleveland area wishing to use the Boeing Computer Services, Inc. (BCS) network are now supported by a local BCS branch office.

Clients previously had to access the network through the vendor's Detroit office, a spokeswoman said.

The branch — at 20600 Chargin Blvd., Cleveland, Ohio 44122 — provides local dial-up access to BCS' Mainstream service as well as education and training; custom programming and consulting support.

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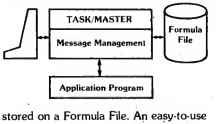
Easy to Use

Data formats and editing criteria for each application are entered by the user and



stored on a Formula File. An easy-to-use format definition facility "leads" the operator through the steps needed to define each message and how it is to be processed. Changes in formats and editing can be made at any time.

During actual on-line processing, Message Management uses this information to display the input and output formats for each message and to edit all incoming data. A wide variety of editing criteria may be specified, including range tests, check digit verification, table look-up, and arithmetic calculations.

Because Message Management has taken care of all input, editing, error handling and output, the application program need only contain basic processing logic.

Long-Term Benefits

The impact of Message Management in your installation can be far-reaching. The time to create new programs will typically be reduced by one-half. The programs will be smaller and less complex. Format definitions and edit information will be centralized and automatically documented. Program maintenance will be simpler and more accurate, and therefore can be done quickly by new personnel.

Message Management is only one of TASK/MASTER's many solutions to specific on-line problems. We'd be glad to tell you about the rest of them. Call or write today for more information.

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Data Throughput Soars

Aircraft Maker Lands Benefits With Key-to-Disk

Special to Computerworld

WICHITA, Kan. — The flexibility and efficiency of key-to-disk data entry, combined with improved methods of entering and manipulating punched card data, has resulted in substantial gains in data throughput for Gates Learjet Corp. here.

The company, manufacturer of the Learjet business jet aircraft, uses a dual Data 100 Corp. Keybatch Model 78 remote processing system to handle a variety of financial, administrative and engineering data.

The Data 100 system replaced an IBM 2922 terminal and five 129 card punch/verifiers.

There were several deficiencies with the 2922, according to Roger A. Smith, manager of DP. "We were extremely pinted-bound. Our card cost was very high and we weren't getting the turn-around we wanted."

In addition, the company wanted an effective data transmission speed greater than 9,600 bit/sec without going to the expense of the 19,200 bit/sec line.

Last April, after evaluating several vendors, Gates Learjet installed the dual Keybatch Model 78 system.

Current System

The current system at the company's headquarters here includes a Keybatch terminal with five local keystations, a 5M-byte disk and magnetic tape.

A Model 78 remote processing system with card punch, 800 bit/in. magnetic tape (shared with Keybatch), 450 card/min reader, 1,000 line/min printer, CRT operator station and a Data 100 data compactor completes the system configuration.

The Wichita system is on-line to an IBM 370/158 and a 370/145 at the headquarters of the parent company, The Gates Rubber Co., in Denver.

Data handled by the system runs the gamut of the company's information and reporting requirements. Jobs processed consist of payroll, labor, parts tracking, purchase inventory, manufacturing inventory, accounts payable and receivable, tooling and all other accounting functions.

Processing language for these jobs is Cobol.

The DATA 100 system is also used by the Engineering Department to transmit data to the host computers when the department's own IBM 1130 cannot handle the size of the calculations required, Smith said. Such jobs are processed using Fortran.

Data is entered via the Keybatch CRT stations, put on the disk and then transmitted to the host computer via the disk with Keybatch communications or to tape, then to the host via the Model 78, he explained.

Greater Flexibility

Smith cited numerous advantages of the Model 78 system — including editing, balancing, tables, reformatting, speed, lower noise level, optional communications to tape or disk, and uniformity of formats.

An example of the flexibility provided by the dual terminal is in the method used in parts tracking and inventory updating.

Gates Learjet maintains this data through a system of documents and prepunched cards. Certain information is already prepunched and preprinted on a card. When the information must be updated, documents are sent out to the user department where the additional information is filled in.

Under the former system, a returned document had to be repunched and reentered in its entirety. Under the software provided by Data 100, the existing cards are read in using what is called the "Aux-in" format, put on tape and transferred to the disk, Smith said.

The data entry operators then call up the data from the disk for display on the CRT. In the "Add-to" mode, the new information is keyed in from the keystation.

This method, according to Smith, eliminates one entire step and saves a tremendous amount of keying.

Balancing Capability

Another improvement has resulted from the editing and balancing capabilities of the Data 100 system. This eliminates the need to rekey and resubmit out-of-balance totals on any job involving hours and/or costs, Smith noted.

Under the former system, for example, employee payroll records incorporating time worked and hourly wages, were keypunched in two documents and then sent over the line to the host computer.

If the computer determined that the figures were out-of-balance, records had to be sent back, corrected and resubmitted.

The present system enables all records to be balanced before they are submitted to the host computer — a further saving in time and keystrokes, he added.

Program Reduction

The formatting capabilities of the system have also enabled Gates Learjet to cut down on the number of coded programs needed to process data while at the same

(Continued on Page 31)

Omnitec Designs Bell-Compatible Coupler, Modems

PHOENIX — Omnitec Data Corp. has added a bevy of Bell-compatible devices with RS-232 interfaces to its modem and acoustic coupler product lines.

The Omnitec Model 103/202 acoustic coupler is a dual 110- to 1,200 bit/sec device which is said to be easily switched between the Bell 103A and 202C operating modes.

The coupler utilizes CMOS logic and can be used on voice-grade lines. In the Bell 103A mode, the unit is capable of acoustic originate and half- or full-duplex operation; in the Bell 202C mode, the 103/202 operates in half duplex, according to Omnitec.

Terminal interfaces for the 103/202 include RS-232C and current loop. The 202 side has switches for 5 bit/sec reverse channel operation; 75- and 150 bit/sec channel capabilities are available optionally.

LED indicators include Carrier Detect and Reverse Carrier Detect, depending on the operational mode, she said.

Modem Additions

Also introduced were four modems: the Model 4700B and the Bell-compatible models 4900, 9202B and 9113.

The Model 4700B mounts into the Teletype Corp. Model 33 ASR terminal with no rewiring, Omnitec said. The Model 4900 connects teleprinters operating at speeds up to 300 bit/sec through RS-232C or current-loop interfaces.

Both of the devices offer access to the TWX or public dial networks for time-sharing at 300 bit/sec through tone-type dialing pads; both are compatible with Bell 101C, 103A and 113B protocols, the spokeswoman noted.

The 4700B and 4900 models have originate, answer, automatic answer and half- or full-duplex operating modes, she said, adding rotary dialing capability is available as an option on either modem.

Omnitec's Model 9202B is an auto-answer, 1,200 bit/sec modem compatible with Bell 202C, -CR, -D, -S and -T units.

It is said to have a full set of LED indicators for all operations and for diagnostic purposes. A 5 bit/sec reverse channel capability is standard; a 150 bit/sec reverse channel operation capability is optional, according to the firm.

The 9202B features half- or full-duplex operation, has programmable protocol capabilities and can interface conditioned or unconditioned voice-grade lines, the spokeswoman stated.

The Model 9113B is basically the same as the 9202B but offers originate, answer and auto-answer capabilities. It is compatible with Bell 103A, -F and -B models.

The Model 103/202 switchable acoustic coupler costs $1,698. The purchase price for the 4700B and 4900 is $798 each; the Model 9202B costs $376 in its basic form and the Model 9113B costs $342.

Omnitec is at 2405 S. 20th St., Phoenix, Ariz. 85034.

USTS Fuses Backbone of Microwave Net

By John P. Hebert
Of the CW Staff

NEW YORK — United States Transmission Systems, Inc. (USTS) has completed the backbone section of its 1,500-mile analog microwave network which reportedly has been designed in accordance with data communications standards.

The network will provide primarily voice but also data communications capabilities to users in major cities along the Atlantic and Gulf Coast corridors from New York to Houston, USTS said.

Completion of the final link from Atlanta to Houston is said to precede extensions this year to eight spur cities along the network backbone.

The net is presently utilized by a few data users on a trial basis, a USTS spokesman said, adding it was designed and built to C-4 data specifications for line conditioning.

For the transmission of data, the user would have to provide modems with the capability to connect digital systems to the analog network, he said. USTS will custom tailor the network to fit the user's needs, he added.

The microwave network operates at 48kHz to 240kHz.

Although 48kHz is equal to the 50- to 56 kbit/sec range, a data user would typically transmit at speeds up to 9,600 bit/sec and could transmit at higher rates with appropriate equipment.

Network charges include a $100/mo terminal charge per end, plus a one-time installation charge per end of $75 for the 48kHz bandwidth, he explained.

Usage charges are subdivided into five mileage categories: 1 to 250 miles costs $8.52/mile; 251 to 500 miles costs $8.04/mile; 501 to 750 miles costs $7.56/mile; 751 to 1,000 miles costs $7.20/mile; distances more than 1,000 miles cost $6.96/mile.

For a new user to transmit any amount of data at speeds up to about 50 kbit/sec for 100 miles costs $200/mo, plus the one-time charge for two ends of $150 and $852/mo, the spokesman noted.

USTS can be reached at 67 Broad St., New York, N.Y. 10004.

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This Model 82 capability can also be added to existing Data 100 KEYBATCH® systems and Model 78 remote processing systems.

Besides industry standard on-line inquiry features, Model 82 offers unique shared display and backup capabilities.

Its shared display capability saves money by permitting individual display/keyboard units to serve both as local data entry and on-line inquiry stations operating from separate Data 100 systems.

Its backup features allow the 3270 emulation program to run in any appropriately configured dual controller arrangement of Data 100 Model 74, 78 or 82 equipment. Ideal for critical on-line applications.

And Model 82 is easy to install. It connects directly to existing IBM coaxial cabling.

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Our new Model 82 remote display system.

WUI Transatlantic Link Provides Access to Data Bases

By John P. Hebert
Of the CW Staff

NEW YORK — Western Union International, Inc. (WUI) has christened a transatlantic link designed to permit access to computerized data bases in the U.S. and the UK.

WUI's Database Service (DBS) recently gained Federal Communications Commission approval and went operational last week, according to a company spokesman.

DBS will permit doctors, scientists and business users to access computerized data bases containing information in specialized fields through teletypewriter terminals.

Users can access the National Library of Medicine's "Medline," which offers current medical data, and also access private organizations' data banks such as Lockheed Corp. and System Development Corp., according to WUI.

In addition, DBS provides international communications access to the remote overseas facilities of multinational corporations, the spokesman claimed.

These overseas branches can access the parent firm's data bases across the Atlantic for routine processing including order entry, inventory control, billing, payroll and sales statistics, he explained.

Connections to a minicomputer-controlled intelligent switching node here will be made by users through Tymnet, Inc. or the public dial network.

The intelligent switch interfaces the 4,800 bit/sec undersea cables, the spokesman explained.

Interconnection on additional domestic networks is expected in the near future, WUI said.

UK users desiring information from various computerized information retrieval services in this country via DBS can connect to a British Post Office (BPO) mini-controlled node through the BPO switched network, he added.

DBS has been tailored for organizations which need periodic access to overseas data base facilities for short streams of information. It is not intended for on-line operation by any one user, the spokesman noted.

DBS features volume-sensitive rates of $1 per six-minute connection and $.50 per 1,000 characters of information transmitted, with a minimum charge of $6 for each connection, the company said.

High-Error Performance

The service reportedly is a high-error performance transmission system, the spokesman added. The intelligent nodes provide error detection and retransmission at each node, in addition to dynamically assigned channel utilization and speed and code conversion.

There is a slight delay in transmission for error checking, the spokesman added.

DBS is compatible with terminals operating from 110- to 1,200 bit/sec.

Initially available to the UK, DBS is expected to be extended to other overseas locations, he said.

Firm Benefits From Key-to-Disk

(Continued from Page 29)

time permitting a greater number of formats.

For example, the company now uses 99 job-ins, as compared to 212 previous programs, each job-in having the capacity for 99 different format levels, Smith said.

There are 16 job-outs, 15 separate tables and 18 formats used for "Aux-in."

Despite the difference between the old and the new, Smith said operators needed only a short adjustment period in converting from keypunching to the key-to-disk system.

Results

Formerly, Gates' 10 keypunch operators were keying about 150,000 records weekly. Under the Keybatch system, the number of records keyed weekly is about 165,000, using the same number of operators.

Keystrokes per hour on the present system are about 12,300 compared with 9,900. The average number of strokes per record is 22.5.

The present system has also solved the printing problem inherent in the former system: the data compactor allows the terminal to transmit data faster than rated line speeds, Smith said.

This means providing an effective data rate of 19,200 bit/sec while allowing the company to retain the 9,600 bit/sec line.

The company is now printing an average of about 950 line/min compared with less than 500 under the former system.

"We're printing 15,600,000 lines per month in a four-week month and in a 5-week month, we're printing 19,500,000 lines," he said. A normal printing week is 68 hours.

Gates Learjet has been using a remote keystation at its Modification and Service Center in Tucson, Ariz. to enter data via the Keybatch terminal.

This keystation is being upgraded to a Data 100 Model 77 communications system to accommodate a growing workload, Smith stated.

Correction

The New York State Police expects to save $33,000 per month — rather than $330,000/mo — by replacing the AT&T Dataspeed CRTs used in its motor vehicle and criminal justice network with 330 ICC 40+ terminals from International Communications Corp. [CW, Jan. 31].

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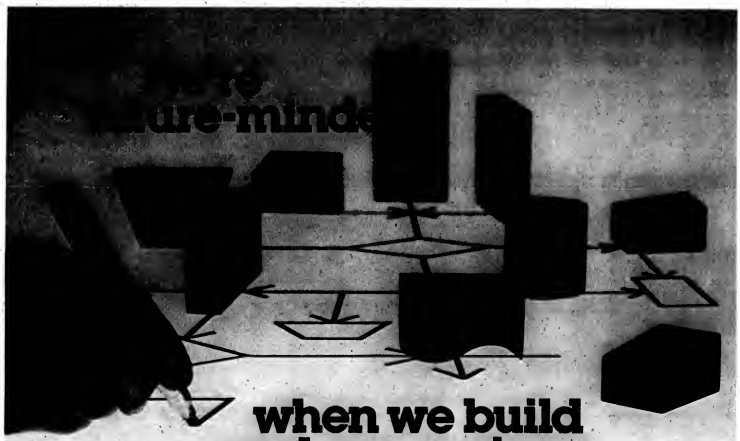

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Martin Marietta Data Systems

Handles Distributed Users

Sycor Forms National Dispatch Service

ANN ARBOR, Mich. — To more closely monitor its terminal users' hardware problems and to minimize equipment downtime, Sycor, Inc. has established a national dispatch system located at its headquarters facility here.

The system was developed to "place a more proper emphasis on the role of field maintenance in a distributed data entry and processing environment," according to Paul T. Cochlan, director of field engineering.

"For multiterminal/multilocation users, the national dispatch system represents a focal point from which Sycor can monitor any problem occurrence in customer information networks," he said.

Using a special In-Wats number, a user can call the toll-free facility in Ann Arbor 24 hours a day, Monday through Friday, to report a problem.

The dispatch operator then keys the customer site number into a Sycor 440 clustered terminal processing system's CRT station which activates the process.

The intelligent terminal displays user identification information which is verified over the phone by the customer for security purposes.

More detailed information on the user site and the problem terminal can be retrieved by the operator from an historical data base resident on the 440's 10M-character fixed disk.

Terminal Transactions

The history includes the date the system was installed, any modifications made to it, the date of last action and previous problem areas.

The terminal operator then notifies the appropriate service center and enters a time by which a field engineer will return the customer's distress call.

After the engineer has completed the necessary maintenance, a call is made to the dispatch operator to update the user data base.

Sycor expects to have all of its terminal customers on the system by mid-March.

RS-232 Units Get Diskette Storage

COSTA MESA, Calif. — The Datamaster II from Western Telematic, Inc. (WTI) is a floppy disk I/O data recorder which adds 311,000 characters of storage to RS-232-compatible terminals.

The data recorder and editing system is intended for plug-compatible attachment between Ascii CRT/printer terminals operating at 110- to 1,200 bit/sec and RS-232 modems, according to WTI.

Datamaster II features random access to any of 2,431 128-character records in an average of .3 sec. Each line or block of data can be automatically numbered and displayed with the option of being printed at the beginning of the line or block when recording or transmitting, according to the firm.

A word-processing edit system reportedly permits correction, insertion, deletion or addition of characters, words or lines without rearranging text.

The device comes with a numeric pad to access line numbers from the disk, 14 function keys and LED display. It costs $2,750 from WTI at Building 5-107, 3001 Red Hill, Costa Mesa, Calif. 92626.

Teletype Offers T/S Teleprinter

SKOKIE, Ill. — Teletype Corp. unveiled for end users its Model 43 teleprinter which has computer I/O, time-sharing and communications capabilities.

The Model 43 features a 5 by 7 dot matrix impact print head, delivers true 30 char./sec throughput and can be formatted for up to 132 columns on 11-in. fanfold paper, Teletype said.

The desktop terminal is compatible with systems that support Teletype Model 33 terminals, the firm added.

Available with an RS-232 or current-loop interface, the Model 43 was designed for use on point-to-point, private-line facilities and on the switched network.

The Model 43 sells for $964 with the RS-232 interface, but without maintenance.

For use on the dial-up network, it can also be leased from AT&T with maintenance, a Teletype spokesman noted from 5555 Touhy Ave., Skokie, Ill. 60076.

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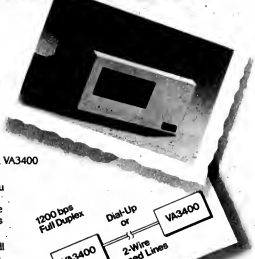

Did you know, Ma, that Vadic has delivered over ten thousand VA3400 modems?

That's right, Ma. To more than 1,000 different customers. You see, Vadic was able to invent a full duplex 1200 bps modem that operates beautifully on either dial-up or 2-wire leased lines because they're modem specialists. And Ma, they did this almost four years ago!

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These field proven VA3400's have powerful displays and diagnostics, too. Using them, operators can pinpoint just about any malfunction in an entire data network. More big news, Ma. General Electric now leases, installs and services Vadic modems at over 50 locations nationwide. And Vadic backs them up with five regional on-line diagnostic centers.

When it comes to industry "firsts", Ma, Vadic sure hasn't been playing games.

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PS: Vadic has shipped over 125,000 modems to date.

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Scan-Data Offers Its First POS System, Based on Micro, for Fast Food Outlets

NORRISTOWN, Pa. — Scan-Data Corp. has introduced its first point-of-sale (POS) system.

Aimed at fast food outlets, the Positran system is based on an in-store microcomputer with 16K bytes of memory.

The central controller supports up to 12 Positran CRT/keyboard registers with cash drawers, up to 12 dot matrix printers and an employee badge reader, according to a Scan-Data spokesman.

The system can be configured with an optional controller for redundant operation and a battery pack power supply which automatically protects memory if normal power is disrupted, he noted.

A combination of intelligent and dumb CRTs is used in the system. Up to four slave CRTs can be tied into one master unit which incorporates a 4K-byte microprocessor as a buffering device, he said.

Each of the two CRT versions has selectable vertical split-screen and split-keyboard capabilities, allowing one unit to be used simultaneously by two salespeople, he said.

The master CRT can be used concurrently by a salesperson and the manager in the split-screen mode because it has a manager's keylock, he explained.

Each screen can display up to 16 different menu items and customer cash transactions without a reduction in the full-

Terminal Transactions

screen character size, he said, adding characters are about 1/4-in. high.

Up to 88 preset menu items with automatic pricing, change and tax calculations and automated special order handling are two of Positran's customer-oriented features, Scan-Data said.

Management Control

Management control features are said to provide extensive reporting for sales analysis, cash control, labor cost control (with the optional badge reader) and inventory control.

The system also allows the manager to modify information to accommodate changes in recipes, prices, menus and personnel, the spokesman noted.

A basic Positran system with a single intelligent CRT/register, a 32-column, 110 char./sec printer and the central controller costs about $5,300 without maintenance.

The badge reader allowing labor cost-control functions costs $530; additional printers are priced at about $1,250 and additional keyboard/cash drawers cost $530 each.

Scan-Data expects to offer 110- to 9,600 bit/sec communications capability with a remote CPU in the second quarter, he noted from 800 E. Main St., Norristown, Pa. 19401.

Volker-Craig CRT Teletype-Compatible

WATERLOO, Ont. — Volker-Craig Ltd. is offering a Teletype-compatible terminal for use in small business systems and in time-sharing and other applications.

The VC-303A includes a serial asynchronous RS-232C interface, 1,920-character display and eight switch-selectable data rates from 110- to 9,600 bit/sec as standard features, according to the firm.

It also features composite video output for slave monitors and direct X-Y cursor addressing by the CPU or operator, a spokesman added.

Options include a detached 11-key numeric pad and an upper/lower case 96-character keyboard and display.

The VC303A costs $1,595. The company is seeking distributors in the U.S.; the unit presently can be shipped to U.S. users from Canada, a company spokesman said from 266 Marsland Drive, Waterloo, Ont. N2J 3Z1, Canada.

There's only one way to get four million bits on a Micro-Diskette. Wangco's way.

The new standard for 5¼ inch floppy disk technology has been established - four million bits of data on a single micro-diskette, possible only with Wangco's Micro-Floppy Disk Drive. For the first time a diskette drive can truly replace cassettes - with comparable price and size, higher speed, random access capability, greater reliability and volume data capacity. How is the new standard achieved?

1. EXTRA TRACK RECORDING - The Wangco Micro-Floppy reads and records 40 tracks of data on a diskette side providing data capacity of 124.7K bytes per side.

2. DUAL SIDED CAPACITY - An exclusive standard feature of the Micro-Floppy permits "flip-side" recording. Using both sides of a 5¼ inch diskette, data capacity is 249.4K bytes.

3. DOUBLE DENSITY - Only the Micro-Floppy Disk Drive permits use of MFM or M²FM encoding techniques to increase data capacity to 249.4K bytes per side or 498.8K bytes per diskette.

Extra track recording, dual side recording and double density recording, all exclusive features of the Wangco Model 82 and usable in any combination, set the new 500K byte standard in Micro-Floppy data capacity.

The Wangco Micro-Floppy Disk Drive is also setting new standards in performance and design with 30 ms track to track access, data reliability of 1x10¹⁰, low 15 watt power consumption and diskette handling features such as a wide loading door and a positive door interlock. And, only the Wangco Micro-Floppy can be daisy chained in a one to four-drive configuration for a total system capacity of 2M bytes. When you can have capacity and a lot more, why settle for less? Get full details from Wangco, Inc., 5404 Jandy Place, Los Angeles, California 90066. (213) 390-8081
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Bits & Pieces

Memorex 6358 Increases 370/158's Main Memory

SANTA CLARA, Calif. — Memorex Corp. has introduced a memory system that will upgrade the internal main memory of IBM's 370/158 and is compatible with the 158 Attached Processor System (APS).

With the installation of a Memorex 6358 memory system in combination with internal IBM main memory, users can get up to 8M bytes — one-third more memory than the maximum offered by IBM, according to a spokesman.

A 1.5M-byte upgrade leases for $1,050/mo on a two-year lease and is available for immediate delivery.

Memorex is at San Tomas at Central Expressway in Santa Clara, Calif. 95052.

IBM 3800 Upgraded Free

WHITE PLAINS, N.Y. — Users of the IBM 3800 printing subsystem may now have their equipment upgraded to 12-line/in. capability at no cost.

All 3800 printing subsystems are now being shipped with the faster capability, IBM said.

Using upgraded spacing and standard character set, available in two versions, the 3800 can print twice as many lines per page as character sets spaced at 6 line/in. while printing in excess of 20,000 line/min.' according to a spokesman.

Use charges, directly related to the amount of paper which is used, will also be reduced as a result of decreased paper use, the company reported.

Capability for 12 line/in. printing has been included in extensions of OS/VS1, OS/VS2 MVS and OS/VS SVS, the spokesman added.

NCR Data Entry Device Tied to Matrix Printer

DAYTON, Ohio — NCR Corp. has developed a compatibility between the NCR 7200 key-to-diskette data entry system and the NCR 6440 matrix printer.

The NCR 7200 Model 1 boasts more extensive printing capabilities than the normal NCR 7200, the firm said.

The modular matrix printer, when used with the 7200, can provide up to five copies of the data entered into the terminal, a spokesman said.

In addition, when data is transmitted to the 7200 from another terminal or central computer, the printer can provide multiple copies of the information, he noted.

The printer operates at 173 char./sec. up to 132-columns wide. It costs $6,590 and rents for $235/mo including interfaces.

The printer is available in March from NCR in Dayton, Ohio 45479.

Rusco Adds Intelligent Reader

GLENDALE, Calif. — Rusco Electronic Systems has an "intelligent" reader for its invisibly encoded Ruscard identification cards.

The reader, a component of Rusco's Cardentry System 500 access control system, incorporates a 8800-series microprocessor, and is designed to communicate in a "handshaking" mode with the System 500 central control console, according to a spokesman.

In the basic reader, the microprocessor is used to read and decode the information on the plastic Ruscard when it is inserted into the reader slot.

The processor also is programmed to handle communications protocols with the central console and to decode and execute commands received from the console, such as "open door," and "lock door."

The reader retails for $750 and is currently available from the firm at 1840 Victory Blvd., Glendale, Calif. 91201.

Eliminates 20 Million Pages

Chicago Bank Gets Paper Cut With COM

CHICAGO — With the installation of a computer output microfilm (COM), the Harris Bank here eliminated 20.8 million 11- by 14-inch pages of computer printout in one year.

The paper was eliminated through the use of a 3M Co. COM system.

Instead of printing multicopy computer reports in paper form, the bank feeds magnetic tapes into a 3M Series "F" electronic beam recorder to produce roll microfilm from which 4- by 6-in. microfiche are reproduced.

The microfiche contain the same data in miniaturized form and are reproduced at a cost of only pennies a piece, according to Bradford J. Miller, Harris' assistant vice-president.

'Greatly Reduced' Costs

"Use of the microfiche in place of paper reports has greatly reduced our costs and at the same time, enabled us to significantly improve service to our customers," Miller said.

Use of the space-saving microfiche makes it possible to maintain data on customer accounts at an expanded number of locations throughout the bank, thus speeding up responses to customer requests for account information, according to the bank's operations analyst, he stated.

Before the transition, data was filed at only four bank locations, because of cost and other limitations in producing carbon copies.

As a result, if a customer requested information on one or more accounts, telephone calls were necessary to obtain the desired data.

The use of the COM system makes it possible to file up-to-date checking and savings data at 40 different bank locations and load data at 20 locations.

Consequently, bank personnel generally have account data at their fingertips and can respond quickly to customer requests for information, he said.

Harris is currently producing about 50 daily, weekly and monthly reports in microfilm instead of paper form, Miller said.

Ranging from 200- to 30,000 pages, the reports result in 725,000 original frames of microfilm and more than 37,000 microfiche originals and duplicates a month, he added.

Information Concentration

Previously the bank maintained savings information on nearly 500,000 cards in several files containing names, addresses, phone numbers and other pertinent information. Now, one file is maintained at 14 locations, each of which has only 50 microfiche, Miller pointed out.

Likewise, checking account names, addresses and special instructions were on card files containing nearly 250,000 cards and this information has been replaced by 12 microfiche which is available at 16 locations, he continued.

The electronic beam recorder's output is also used as backup for on-line checking and savings account systems operated by bank tellers. Charge card on-line systems are also backed up by microfiche.

Other microfilm forms such as rolls, jackets and diazo duplicates are used for signature card, letter of authority and other files.

In addition, satisfying requirements for document storage is greatly simplified because statements and other reports which previously were retained in a warehouse are now easily filed in miniaturized microfilm form in-house in one of several microfilm formats, Miller said.

CCC Interface Turns Keypunch Into Remote Card Reader/Punch

PHILADELPHIA — An interface designed to equip IBM 029 keypunches with the capability to send and receive EIA signals has been introduced by Community Computer Corp.

The unit converts a manual keypunch into an automatic card reader/punch which can operate directly from any device receiving or sending standard codes, such as minicomputers and printing or CRT terminals, according to a spokesman.

Designated the CCC 1700A keypunch interface, the device receives bit serial data, converts it to Hollerith code and transmits it to the keypunch where cards are punched.

A 250-character buffer allows data rates to exceed the punch rate of the keypunch, the spokesman indicated.

When functioning as a card reader, the 1700A is capable of reading a deck individually or continuously. Part or parts of the cards may be skipped if the information is not wanted.

The interface then converts the keypunch output from Hollerith code to bit serial code and transmits the data to the receiving device, the firm said.

The 1700A is configured in two sections, the mainframe and the control panel. The former contains all system electronics on five plug-in circuit cards, two of which are dedicated to sensing and driving the 029 keypunch, and is essentially a junction box for all cabling.

The control panel provides total system control, such as mode of operation and keypunch status, CCC said.

The 1700A mainframe sells for $2,725 and the control panel for $125. CCC is at 185 W. School House Lane, Philadelphia, Pa.

CMI Adds Buffer Managing Unit

BEDFORD, Mass. — A buffer management system for the IBM 370/155-II with dynamic address translation (DAT) capabilities has been introduced by Cambridge Memories, Inc. (CMI).

The BMS/155-II is compatible with most IBM and independent memories, according to the firm.

The system complements an earlier version designed for the 370/155-I without the DAT or virtual storage capabilities, the firm said.

Both versions attach directly to the 370/155 processor and are transparent to both hardware and software, according to a spokesman.

The BMS/155-II reportedly enhances system throughput by increasing the efficiency of the 8K cache buffer memory integral to 370/155 processors.

Data stored in cache memory is accessed by the processor within 230 nsec, while 2 msec are needed to fetch data from main memory.

The BMS/155-II includes a control panel with a configuration switch which allows the management system to be taken off-line. It also provides automatic error logging and features a cooling system and mechanical design equivalent to that of IBM, the firm added.

Prices for BMS/155-II range from $45,000 to $75,000 depending upon configuration.

Deliveries take 60 days from CMI at 12 Crosby Drive, Bedford, Mass. 01730.

Switch Maker Cuts Off DP Shop Overtime

MOUNT VERNON, N.Y. — A manufacturer of time switches here put one of its products to work in its DP shop and found it could get maximum use of its IBM 3/10 in peak periods without the cost of overtime.

The 3/10 time switch has also permitted Tork, Inc. to utilize a slower and less costly printer and obtain the same timely reports, according to Ted Christiansen, Tork's DP manager. The switch turns off the 3/10 after normal work hours, he explained.

"We use the timer for jobs that can be set up and do not require maintenance during the run," Christiansen said. "These are long jobs where the computer can run itself, jobs such as reading from disks for the printer to produce a long listing or updating one disk file onto another disk file."

The system has allowed his department to run as many as 65 hours over normal in one month with no costs for staff overtime, he added.

The procedure Christiansen developed was a natural consequence of the fact that Tork manufactures time switches for automatic on/off control of lighting and electrical equipment. If a time switch can be used to turn on or off an air conditioner, Christiansen reasoned, it can also serve to control a computer.

The idea for the use of the timers developed after three local power failures which did not affect follow-on 3/10 operations, he said.

The important feature to Christiansen is that timing programs can be set or reset as required. On nights a job is to be run, he estimates the time of the run and sets the time switch to turn power off about one hour after completion.

"We set up the computer and start it, and then we leave. The 3 will stop operating when it completes the job, but we want to have power off as soon as is practical," he said.

"We're very conscious of the need to conserve energy and not waste money in unneeded kilowatt hour consumption," Christiansen said. "The omitting device eliminates the possibility of someone forgetting to turn the computer off on a Friday night."

Turning the power off by time switch has had no adverse effect on the 3/10 to date, Christiansen reported. He has been operating with it for more than 30 months.

The Tork time switch is available at electrical distributors nationally and can be installed by electrical contractors or plant electrical personnel. It usually retails for less than $32.

Increases Flexibility

Key-to-Disk Helps Firm's Productivity

MILWAUKEE — Milwaukee Insurance here has increased key operator productivity, improved uptime and gained flexibility with a key-to-disk system that will later allow it to add optical scanning to the system, according to Ken Grabow, vice-president for DP.

Operating through independent agents in Wisconsin, Minnesota, Illinois, Indiana and Iowa, Milwaukee Insurance has more than 180,000 policyholders with $40 million in property and casualty insurance and $200 million in life insurance currently in force.

The firm's key entry operation serves seven user departments within the company, performing 40 different key entry jobs.

The tasks include agent statements, departmental budgets, life insurance policy billing, maintenance of central records for intercompany use, name and address files for agents and underwriting and policy adjustments.

In 1973, the firm replaced its seven-station key-to-disk system with a Cummins-Allison Corp. nine-station 4400 keyscan system.

"The system in use at that time was not able to keep up with our needs," Grabow said.

Growth Capability Sought

Grabow and Bruce Winter, DP manager, reviewed five other vendors' systems before selecting Cummins-Allison. "We chose Cummins-Allison because it appeared to us as being the state of the art and had the capability to grow in line with our needs," Grabow explained.

The Cummins key-to-disk system includes a 64K processor with 4.9M-byte disk drive, 9-channel 800 bit/in. tape drive, line printer and nine CRT keystations.

"We have found that since installing the new system our key entry business has increased by 55%, but the time needed to handle that business has been reduced by 20%," Grabow said.

"The new system also offers us the capability to add low-cost optical scanning peripherals which we feel will be necessary within the next 18 months," he added.

"Our previous system was down nearly 20% of the time, but the Cummins system's downtime is less than 1%," Winter said.

'Numer Feature'

"The Cummins system has provided me with the means to evaluate my key operators," according to Jean Costello, supervisor of key entry. "The system's numer feature provides me with weekly operator and file statistics which I review with individual operators."

Key operators at Milwaukee Insurance enter records into key-to-disk system.

"This data enables me to determine operator productivity, knowledge of job and efficiency, all of which are primary elements in operator evaluation," she continued.

The system has also been well received by key operators, who enter approximately 60,000 80- and 124-column records each week, Costello noted.

"The prompter screen, reformatting and editing capabilities and keyboard design have made key entry much easier than it was with our previous system," she said.

Certain key entry jobs at Milwaukee Insurance require reformatting of the data and the previous system, which did not have the capability, required considerable memorization by operators for proper entry.

"That was a problem area," Costello said. "Fortunately, our new system has this capability and has alleviated this situation."

"Our decision to bring in Cummins-Allison equipment has proved to be a good one," Grabow said.

"The system has exceeded our expectations, and we're looking to the future when we enhance our system's capabilities through the addition of optical scanning," he added.

After all, we could have gone skiing...

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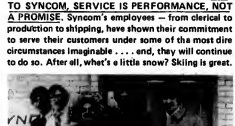

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Memory Conversion And Increase Enhance Insurer's 370/168

TORONTO — A replacement and increase of memory for Manufacturers Life Insurance Company's (Manulife) IBM 370/168 has allowed the firm to run a more powerful operating system.

The conversion involved the replacement of 3M bytes of memory, two of which were installed IBM memory. The 4M bytes of replacemeirt memory were all supplied by Memorex, according to a Memorex spokesman.

The facility, with its configuration of 3M bytes of Memorex 6268 memory and 1M byte of IBM memory, is now capable of running its Model 168 under IBM MVS instead of the prior MVT operating system, the spokesman said.

Manulife, Canada's second largest insurance company, has its main office in Toronto, with 40% of its customers located in the U.S., 35% in Canada and the rest situated around the globe.

The company has more than 100 branch offices throughout the world, with 46 in the U.S. Communications to the CPU take place through computer terminals over dial-up Wats and Bell Canada Datarouie lines.

The lines are connected to a Memorex 1270 terminal control unit that interfaces the terminals with the CPU, according to the spokesman.

Remote computer terminals are also located in London, San Juan and Honolulu.

Manulife's DP facility processes 750,000 life insurance policies.

Each night, some portion of the policies are processed for billings of premiums, collecting information, accounting data for the company's managers and planning information. About 100 different printed forms are used in the production of the computer outputs.

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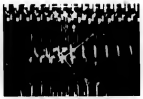

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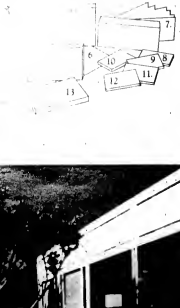

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ITC's founder, J. Reid Anderson, exemplifies our quality heritage. Educated at Denison University and the University of Michigan, Anderson holds 30 U.S. patents and has founded two successful companies, Anderson Jacobson and ITC. Early days at Bell Labs introduced him to magnetic recording techniques for audio and data applications. His subsequent experience at NCR and Stanford Research Institute focused his interest on computers and commercial applications for removable magnetic storage media. A dedicated man, Anderson demands only the highest quality in all Verbatim products. He and Executive V.P. Dr. Peter McCuen have built a staff of technical and marketing experts who feel the same way.

ITC has one of the finest media development groups in the world, backed up by a strong engineering department and a modern, efficient production facility. It took the teamwork and the genius of all these people to produce Verbatim products.

Removable data storage media is certainly a part of your future. Whether you use floppy disks, cartridges, mag cards or cassettes – at work or in your home – you will want to know about ITC. And if you demand quality in the media you use, don't leave it up to chance. Order it by name: **Verbatim.**

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To Determine Best Milk Givers

Model Developed to Apply Actuarial Principles to Cows

PROVO, Utah — America's dairy cattle have been intensely purebred, managed, analyzed, computerized, control-fed and production-checked. In fact, although there are now only half as many dairy cows as 20 years ago, dairymen have kept up with the demand for milk through genetic improvement and better management.

But there's more to come.

Animal science and computer experts at Brigham Young University (BYU) here are going to apply to Bossie the actuarial principles used by insurance companies on people.

Lee Day, a graduate student in animal science, is applying the insurance principles to dairy herds on a $3,000 research grant to BYU from DHI Computing Service, a computer center for dairymen.

The BYU College of Biological and Agricultural Science and the Department of Animal Science are participating equally. With the research being done under project officer Dr. Robert L. Park, professor of animal science. The funds are being administered through the BYU Research Division.

Day worked in the life insurance field several years as an actuary, one who computes insurance rates and reserves. His thesis project will apply the mathematics of his life insurance experiences to dairy herds to help cull out the least profitable producers.

By feeding the computers the most current data on each "individual" in the herd, Day and Park said they hope to forecast the profits (income vs. expenditures) and find the present values of future profits.

The dairy cows will be ranked by the present value; the dairyman could then cull the cows ranked the lowest.

Trial Model

Day is in the final stages of the trial model that took four months to prepare. He will test the data using DHI-gathered information from the 400-head BYU dairy herd as well as several other large representative western herds.

"Our goal is to make a model simple enough to be economically feasible for a monthly report to the dairymen," Day said.

Bliss H. Crandall, former professor and administrator at both BYU and Utah State University, who has been owner and general manager of DHI for several years, said he is delighted with the project.

"Dairymen, historically, have probably kept the best records of any business for the past 75 years," Crandall said. "With cows now producing twice as much milk today as their ancestors did 20 years ago, Day's research will sharpen the dairymen's tools even more."

Crandall pointed out that each cow in a dairy herd must be managed as an individual to provide for efficient production. Herds producing fluid milk for a Grade A market should maintain a fairly consistent flow of milk from day to day.

Dennison Tag Imprinter Meets OCR-A Standard

FRAMINGHAM, Mass.— Dennison Manufacturing Co.'s 800 series optical character recognition (OCR) tag and label imprinter, was designed to deliver the print quality, accuracy of character shape, size, density and spacing for OCR data capture, the vendor said.

The 800 series meets the National Retail Merchants Association's requirements for OCR-A printers, a spokesman added.

The possibility of human error is reportedly eliminated because all settings of the Optimatic printing system — character alignment, imprint position and impression force — are made to standards at the factory.

Self-Cleaning System

The 800 series features the Protecto-Band non-abrasive, self-cleaning system, the Metergraphic inking system, which uses a disposable preinked pad and rack-and-pinion controlled roller, delivers a premeasured amount of ink to the print bands on each printing stroke, providing consistent character shape, size and density with almost instantaneous drying, the firm claimed.

Ink Monitoring Available

An exclusive full-time ink-monitoring system is available which records the number of impressions from each ink pad and shuts off the machine when a predetermined total has been reached.

The 800 series cannot misalign either top and bottom or side margins, the company claimed, because orientation fingers drop into positioning slots on the tickets and hold them in place during printing.

An open-throat loading design allows the operator to reload the ticket supply in less than a minute, the company indicated.

The printer costs about $1,000, the spokesman added from Dennison Manufacturing Company, Framingham, Mass. 01701.

Xerox Cuts Forms Printers Cost

EL SEGUNDO, Calif.— Price reductions of up to 30% on forms printers and a three-year lease program for communications terminals have been announced by Xerox.

The printer reductions — 21% on purchases and 30% on lease-to-purchase conversion prices — became effective Feb. 1, according to the company. Reductions were also made on maintenance rates and accessory prices.

A three-year lease permitting accrual of 60% of lease payments toward purchase accompanies revised lease rates and purchase prices on the Xerox 1700/1710 communications terminals. A typical model sells for $3,240, according to the firm.

One-year 1700/1710 lease rates will increase by about 8% and purchase prices by 2% to 5%, it added.

Communications terminal pricing changes are effective immediately for new orders. Effective dates for current customers will depend on the renewal dates of their agreements, the firm said.

The communications terminals and computer forms printers are produced by the Data Systems Division of Xerox, El Segundo, Calif. 90245.

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Plotmaster System From Gould Designed for 360/370 Users

CLEVELAND — Designed for use with IBM 360/370 computers, the Gould, Inc., Plotmaster System consists of an electrostatic printer/plotter available in six models, graphics software and a hardware interface to link the printer/plotter and software.

The interface can consist of an on-line controller, a tape drive for off-line operation or a combination of controller and tape drive, affording either on-line or off-line operation, Gould said.

Plotmaster System

The Plotmaster System can be linked to any IBM 360/370 operating under DOS, OS or VS, including systems with Hasp, ASP, Power, Grasp, MFT, MVT, PCP, VS1 or VS2, the firm said.

The resolution of the Plotmaster System can be modified by software to produce "halftone" effects, useful in applications involving continuous-tone copy, a spokesman added.

Faster Than Microfilm

The system produces up to 200 dot/in. hard-copy from 50 to 400 times faster than incremental pen/plotters, Gould claimed. Since no film processing or enlargements to hard copy are involved, Plotmaster produces drawings or copy faster than microfilm systems, the company added.

Each Plotmaster System can be supplied with any one of six Gould printer/plotters — the models 4822, 5000, 5005, 5100, 5105 or 5200. The units and accompanying software provide paper width selections of 8.5-, 11- and 22 in.

Interface Possibilities

The Plotmaster System can interface with a Datagraphix 4020 simulator, Information International FR-80 simulator, a California Computer Products, Inc. 835 computer output microfilm processor, a 3M Betacom Graphics processor or a Gould Display business graphics language package, the firm said.

Prices for the Plotmaster System range from $25,000 to $35,000. Gould is at 3631 Perkins Ave., Cleveland, Ohio 44114.

Key-to-Diskette System Offered For Clustered Data Entry Sites

BARRINGTON, N.H. — A multistation key-to-diskette data entry and communication system has been released by Business Systems and Terminals, Inc.

Called the J100, the stand-alone system allows multiple operators to enter, edit, verify and store data on diskettes or larger disks under software control, the firm said. The system was designed for clustered data entry sites and distributed networks.

The J100's master station is a 16-bit CPU with up to 128K bytes of memory, direct memory addressing, a 1,920-character CRT and two diskettes, a spokesman added.

Options

Options include satellite CRTs, 30 char./sec to 300 line/min printers, minicomputer console, expansion chassis, asynchronous/binary synchronous communications, tape drives and 6M- to 320M-byte storage drives.

The J100 provides fixed entry validation, accumulators, arithmetic and logic functions and I/O formatting, the spokesman said.

Data output can be directed to the communications facility or, using the system data management (background) capability, to a line printer, auxiliary disk or display units, the firm said.

Application packages include Hasp remote job entry, word processing, voter registration and mailing list, IBM 3270 workstation, data entry compiler, order entry, general ledger, accounts receivable, accounts payable, payroll and custom software, according to the spokesman.

Operational Features

Operational features include multiuser support; time-sharing with diskette- or disk-based hardware; time slicing for multitasks; sequential, random-access and hashed index file access methods and peripherals support, Business Systems and Terminals said.

Software features include reentrant code; choice of Assembly or "Data Base Basic" languages; batch and interactive modes; file management; and extended labeling capability.

A minimum system costs $12,200 from the firm at 2 Oak Hill Lane, Barrington, N.H. 03825.

Tag Scanner Reads NRMA Standard Code

GLENVIEW, Ill. — A tag scanner that is said to read codes developed by the National Retail Merchants Association (NRMA) as the Voluntary Retail Identifications Standard A-1974 at a rate of up to 500 tag/min has been developed by Cummins-Allison Corp.

The Model 4229-52 OCR-A tag scanner will read tags from 1- by 1-5/8 in. to 1-1/3- by 3-1/8 in. from any supplier, the vendor said.

Users with horizontal tags measuring from 1- by 2-7/8 in. to 2-1/2- by 5-3/4 in. can use the Model 4216-50 scanner, which reads up to 1,000 tag/min, the company added.

The 4229 has an internal power supply, transport and stacker, optical character recognition (OCR) electronics, controls and interface logic. It is equipped with a jogger-type input stacker which the firm claimed assures the proper alignment of the tags as they enter the feeding device.

Control

The scanner operates under control of a 3400, 4400 or 5400 keyscan system, according to the company. Real-time validity checks can be made for field length errors, check digits, limit tests and lookup tables, a spokesman added.

Rejected tags are processed in the Key Correct mode of operation which requires the key entry of characters not correctly scanned, eliminating the need for additional keypunch or key entry equipment, he said.

The reader costs $36,900 or $918/mo on a five-year lease with maintenance. A complete on-line system leases for $2,020/mo on a five-year contract with maintenance.

Cummins-Allison is at 800 Waukegan Road, Glenview, Ill. 60025.

Superminis — Part 2

Growth Path No Problem, But Software a Concern

By Esther Surden
Of the CW Staff

Although users of large-scale minicomputers — those machines which have come to be known as "superminis" — are very enthusiastic about the capabilities and cost benefits of their systems, they are concerned about software support.

But one thing these users aren't worried about is an adequate growth path, a recent *Computerworld* survey found. When their configurations are pushed, they said, they will either offload to smaller dedicated systems or get another supermini.

Most of the users feel their staffs need a sophisticated knowledge of the system and its software to be happy with the machine. "Support is not a strength of the mini makers," according to Jud Breslin, assistant to the chairman at Schlegel Manufacturing in Rochester, N.Y.

The mini makers "are used to dropping the system off at the university or a medical lab and leaving it," he remarked.

But this could be changing, he said. The Hewlett-Packard Co. 3000-II user indicated that a "hotline" that "we pay for" affords quick access to needed support.

Schlegel, a manufacturer of textile products, had been pushing an IBM 360/40 to capacity before going the supermini route.

"We wanted to put more applications on-line, but we ran out of space," Breslin recalled. The company was spending several thousand dollars each month for the hardware and the options for increased on-line operation would have hiked the monthly bill by another $3,000, he said.

The firm chose the HP system after sending out a request for proposals to both mainframers and mini manufacturers. Schlegel found "the IBM 370/115 would have been about $12,000 monthly while the large-scale minis ran about $4,700 monthly," Breslin said.

Although the quality of software available for large-scale systems sometimes has been criticized, Breslin said, "it has lived up to its 'reputation' for his system.

And although software support may be lacking, "there is something healthy about creating a staff that can be self-sufficient," he believes.

Schlegel converted most of its applications from its previous system and therefore didn't run into much difficulty looking for applications packages. It did need a manufacturing package and "found two that would fit our needs," Breslin said.

The firm acquired one of them and rewrote it from Basic to Fortran to fit its needs. There was no trouble with the concept of it, he stated.

Another user, Bob Jordan, DP director at Gazolo Drug and Chemical Co. in Chicago, called the software support for his Digital Equipment Corp. PDP-11/70 "the biggest laugh I've had in years."

"I had an operating system (RSTS) problem recently and I called out to Rolling Meadows, the local service area, and there was no one available who knew the operating system. They've all left or been promoted," he said.

The supermini replaced a full-blown IBM 360/20 and, despite the problems with software support, "looks like a fantastic choice," Jordan said.

The system has brought great cost benefits to the wholesale services firm, he said. "Our first system was an IBM, but we had a lot of jobs we wanted to do. We asked IBM for an estimate of how much it would cost to do the jobs and it came back with something that would cost more than we would make for the next five years," he said. At that point the firm turned to the DEC supermini.

Expansion on the 11/70 is not a problem, Jordan emphasized: "We can expand a great deal. The 70 will carry us a long way."

If more power is needed, the company will go to a second system instead of a mainframe, he stated. Right now, it is solving its expansion problems by using a dedicated Microdata system for order entry.

The drug firm programmed its PDP-11/70 in-house, which cost less than it would have for a mainframe, he said.

"Manuals No Good"

In the opinion of another supermini user, the mini makers are interested in the end user but don't quite know how to support him yet.

"The manuals aren't any good," George Psihogios, manager of DP and office services at the Chicago-based Grotnes Machine Works, a subsidiary of Inland Steel, complained.

"It's a lot of trial and error," he said about dealing with the minicomputer makers. "In the case of Data General, the attitude toward the end user was kind of light at the beginning for the commercial applications.

"But it was interested when I began hollering about the RPG-II manual and brought someone out to look at it with me. I spend some time explaining what was wrong with it."

The firm, an Eclipse C/300 user, has a DP history that goes through the use of a service bureau and its own unit record devices to on-line operation with intelligent remote job entry terminals to Inland's data center.

The system handles all the business applications as well as manufacturing control for the firm, which designs and builds

(Continued on Page 45)

Firm Molds Mini Savings Despite Reservations

By a CW Staff Writer

BIDDEFORD, Maine — "We have the only installation in Maine, the closest backup is in Cambridge, Mass., and when we first got the system we thought we made a terrible mistake," Peter Gilman of Shate Symmetry and Sun, Inc. recalled.

But the Lockheed Electronics Co., Inc. small business system installed at the firm has turned out to be a good deal, Gilman indicated. "We now have no regrets about purchasing the system," he said.

Shate's reservations about going with Lockheed were overcome by price comparisons to similar systems, he added. The plastic moldings manufacturer converted to the system from an IBM 3/6.

In its present configuration, the small system is saving the firm almost $3,000/mo over an equivalent IBM system, he estimated from quotes by IBM and the amount the firm pays monthly for the financed system. The Lockheed system costs about $1,100/mo.

Outgrew 3/6

With sales in the $5 million range, the three-year-old firm knew almost from the beginning it had to have some kind of computer. "We started with the 3/6 so we could get some basic packages on a system," Gilman noted. "We outgrew the Model 6, so we shopped around for price and picked Lockheed."

The system was installed in November 1975. It has 40K of memory, 10M bytes of on-line storage, a 400 line/min printer, two local terminals and an operator's console.

Presently the system is performing all the accounting applications for the firm and keeping track of molding production and a portion of the inventory. Payroll is done at a local bank.

Gilman, who does all of the programming for the system, is working on a product control program to keep track of everything from scheduling and order entry to shipping. The program will also keep tabs on all of the assembly work, he said.

All of the foremen at the company enter their own data into the system to get the needed reports, Gilman stated. That way "everybody does his own work."

'Not Difficult'

Training the foremen was not difficult, he added, because the "terminals tell them what to do and where to put the data" and "I've written reference manuals for them."

Gilman described the system's hardware as very good, but said the software leaves something to be desired. "It's a relatively new compiler and it has some bugs. The vendor is sending out fixes and within the last year I've seen a big improvement.

"For one thing, it transferred its staff from California to Plainfield, N.J., and I've noticed better support since then," he noted.

Shate has already outgrown its 40K memory and hopes to increase it with semiconductor core to 256K bytes. In addition, it is waiting for Lockheed to offer multitasking support to allow the company to add on more terminals.

After these additions, Gilman believes his system will last the firm for several years.

Ball Adds 3330-Type Disk

SUNNYVALE, Calif. — The BD-80 disk drive from Ball Computer Products, Inc. is an 80M-byte storage module designed for minicomputers.

The drive, an IBM 3330-type short-stack version, can be used in a subsystem with Ball's 3300 formatter to support four drives with 320M bytes of storage, the firm said. The support of eight drives is optional.

The B-80 incorporates some features found in Ball's BD-8 disk drive such as a triple cooling system in a sealed mechanism and a constant-voltage power supply, a spokesman added.

The basic drive includes a 3330-type spindle interface and uses a track-following servo system. Dynamic braking, digital I/O and a power supply with ac power cable are standard features.

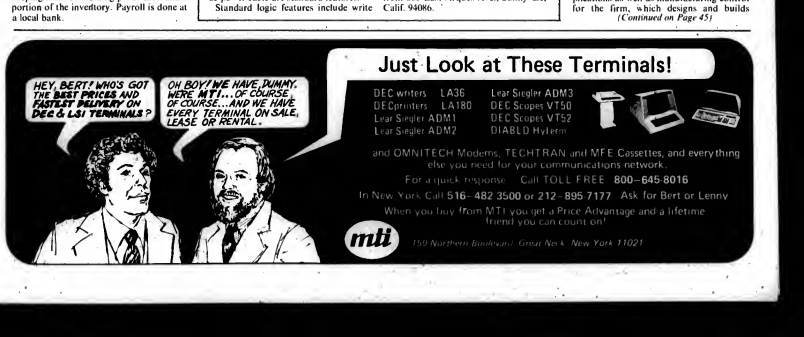
Standard logic features include write protection, address mark detection, variable sector sizes, sector address and cylinder status, the company stated.

With the standard I/O, the BD-80 is plug-compatible with California Computer Products, Inc. Trident-type drives, the firm said. Disk packs contain five read/write surfaces with 815 cylinder/surface at 370 track/in.

The start/stop time for the drive is 20 sec, the average access time is 30 msec and the data transfer rate is 1.2M byte/sec, Ball said.

Track-to-track access time is said to be 5 msec.

The BD-8 costs $7,900 or $5,600 in quantities of 20 or more. It will be available in April, the company said from 860 East Arques Ave., Sunnyvale, Calif. 94086.



First IBM 3/15D User Plans On-Line Inventory Control

CINCINNATI — The first user of the IBM 3/15D, introduced last June, expects to run increased on-line applications for inventory control.

"We wanted on-line system to correct imbalances in inventory that occur between our five branch locations," according to John Pfeifer, DP manager for South-Western Publishing Co. here.

The textbook publisher determined it needed 300M bytes of disk storage to run the on-line system, an amount not available with its 3/10. But it wanted to be able to use the 3/10's base of about 700 RPG programs.

At the time, the only alternative for the firm was a move up to an IBM 370 or over to a Univac 90/30, Pfeifer said. When IBM came out with the 15D, it seemed "a practical, cost-justified way with a minimum of technological retraining and reprogramming," according to Elmer A. Kaising, vice-president, controller and assistant treasurer of the company.

Currently all the batch programs run on the 3/10 are running on the 3/15D, Pfeifer noted, and the communications applications are being tested. The programs needed to be recompiled for use on the 15D, he added, and this took about 14 hours.

The 3/10 used IBM 5444 disks and the 3/15 uses 3340 disks so "we ran source code out to tape and wrote a little program" to change the device names. "We used all three partitions to recompile," Pfeifer explained.

Promotional Tasks

South-Western first began using computers in 1967 when it installed an IBM 360/20 to handle the more than 170,000-name sales promotion letter-writing and promotional services management tasks previously handled by punched card equipment.

Later, centralized billing and upper/lower case letter-writing applications were added.

"We gradually added accounting and inventory applications as we evolved from the Model 20 to the IBM 3," Pfeifer said. "But central to our operations has been and continues to be our sales promotion activity — now involving more than four million mailings annually to some 210,000 teachers."

South-Western also has used its systems to analyze the effectiveness of teaching techniques.

"Late in 1966," Kaising said, "we began research into the theoretical structure of texts, entering words to determine whether the theory was reinforced effectively in all examples given the student.

Computer Processed Texts

"Our studies further analyzed how well students mastered the theoretical us well as the practical elements being taught. And, our studies showed, students actually learned better with the computer-processed texts than with others."

The shorthand system thus analyzed was introduced in 1975 as "Century 21 Shorthand." South-Western's typing text utilizing the computer-analyzed technique is "Century 21 Typewriting."

"Using the system," Kaising said, "we developed precise counts on the use of each theory principle, each shorthand character and each high-frequency phrase on a lesson-by-lesson basis."

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Data General

Real-Time Mini Helps Out With Construction Specs

MIAMI — A real-time minicomputer has replaced a batch system at Monex Corp. here to help the firm provide its customers with specifications for construction.

The mini and its associated drum plotter aid in the design of wooden trusses, which are fasteners used in the construction industry, according to Bob Poh, systems analyst for the firm.

Goodwill Operation

"It's kind of a goodwill operation," Poh explained.

The firm receives calls from customers about planned floor and roof framings and calculates the specifications for the most efficient and economical installation of the framings, he said.

Prior to the installation of the real-time mini, the firm had been using an IBM 1130 batch system, which Monex's director of sales termed an improvement over the manual way of doing things.

"Traditionally, the development of specifications for wood truss installations required a number of days," Len Naurison, director of sales, explained.

"The salesman would visit the construction operation, record the information on-site and mail it to the company. There the calculations were made and the specifications returned.

"The long periods of time involved and the handwork not only cost money, but often led to errors," he recalled.

The batch system helped solve the problem — the salesman could phone in the data and information was punched on cards and entered into the system — but Monex felt a real-time system was necessary.

"With the purchase of the Hewlett-Packard 9640A, we have made the transition to a real-time system. The data communications capacity of the system allows our major customers with terminals to talk directly with the system, receiving the desired information," Naurison stated.

Brief Report

Between two and 13 lines of text are input to the system, Poh explained. Output is a brief report of a couple of dozen lines.

All programs are written in Fortran, he added.

The system keeps a record of specifications on loading, forces reactions, minimum lumber grade and spacing and also prints an exact drawing of the truss configuration.

Printer Controller Fits DEC, DG Machines

ANAHEIM, Calif. — Riandu Electronics, Ltd. has line printer controllers that are said to be both software- and hardware-compatible with Digital Equipment Corp. PDP-11 or Data General Corp. Nova minicomputers.

The controllers can be factory- or field-configured for Dataproducts Corp., Centronics Data Computer Corp., Printronix, Inc., Tally Corp. or equivalent printers.

Minimum Configuration

The minimum configuration supplied includes the controller, which is on one circuit board and fits into the mini's chassis; a cable; a diagnostic routine on paper tape; and an instruction manual.

The controllers cost $1,000 each with quantity discounts available. Either factory integration of the user's printer or on-site installations can be accommodated, the firm noted from 2535 Via Palma, Anaheim, Calif. 92801.

Too Much Processing for Bureau

In-House Mini Credited With Expanded Loan Service

By Richard M. Elliott
Special to Computerworld

MEMPHIS, Tenn. — A turnkey minicomputer at the Memphis Area Teachers' Credit Union here is helping this nonprofit financial institution offer savings accounts and low-interest loans to its members.

The credit union serves 22,000 teachers and educational personnel in Shelby County and the surrounding counties. In 1973, the processing of transactions on more than 20,000 loans and savings accounts became too great for the service bureau hatch system the credit union had been using. So it switched to on-line service with the same company, using hard-copy terminals in the offices. At that time, two branch offices were opened in sections of Memphis.

By 1976 the credit union had grown to more than 40,000 loans and savings accounts. The high cost of the on-line system and excessive downtime from telephone line problems caused it to look for a better system. The decision was made in May 1976 to purchase a real-time, in-house system from Ecom Systems, Inc., a Memphis firm.

The heart of the system is a Digital Equipment Corp. PDP-11/70 CPU with 96K words of memory utilizing RSTS/E, a time-sharing operating system. Also, the credit union has two 20M-byte disk drives, a 1,600/800 bit/in. tape drive and a 600 line/min printer. In the teller area: a 180 char./sec printer is used for inquiries.

The tellers communicate with the system via terminals. The main office has six Hazeltine CRTs operating at 9,600 bit/sec, two 30 char./sec Decwriters and four Interdata Carousel 300 terminals. The Interdata terminals have a "drop-in" document insertion feature which is utilized for printing checks, receipts and journal vouchers. Each branch location has one CRT and one Interdata unit.

The system is very flexible, allowing different tasks to be run simultaneously. A training file, distinct from the live files, allows employees to be trained during business hours. The system provides updating of member information on each transaction as well as inquiry to all member information. A range of management reports can be run at any time.

The system was installed in October 1976 on a turnkey basis by Ecom. The conversion of data in the present system was done by vendor personnel over a weekend. The system has enabled the firm to give better service at a reduced cost.

Elliott is general manager of the Memphis Area Teachers' Credit Union.

Supermini Growth No Problem

(Continued from Page 43)

customer metal-forming machinery and machinery systems.

The company chose the Eclipse over the IBM 3 and DEC PDP-11/45 because the IBM system was too small and at that time DEC's RPG could not access indexed sequential files, Pilhogios said.

Programming for the system has been either developed in-house or converted from previous systems. "We did look outside for a payroll system, but we would have had to make a substantial amount of modification to it," he stated.

Support for the operating system has been good, he noted. "A phone call brings an engineer and if the problem isn't found he'll even call back to headquarters," he said.

Satisfied with his system, Hal Harden, a programmer/analyst at Cisco-Atlanta, Inc., a credit card processor, said, "I wouldn't take an IBM system if someone gave it to me. I have the power of a 370/145 for a fifth as much."

Cisco-Atlanta, which has a DEC PDP-11/70 and a very large optical scanner from Recognition Equipment, Inc., never considered a mainframe before choosing the supermini. The user is happy with the amount of work the system can do.

But software support is another question. "The documentation is a little shaky," Harden noted, "so you need a sophisticated software department."

Another user, a guitar manufacturer who is also an enthusiastic promoter of superminis, said that "any operating system is going to have bugs." The real test is how well the vendor responds.

"DG has been pretty good at responding and two to three days lag time isn't going to hurt our users," the Eclipse C/300 user said.

"The mini makers are more likely to issue patches; maxi makers come back with a fix right away and put it in their next release," he added.

The question with a large-scale mini is: "Is it effective? Does it do the job we wanted it to do?" If the answer is yes, then the other things don't matter, he indicated.

MSC Disk Controller Now Supports PDP-11

SUNNYVALE, Calif. — The MSC-1000 intelligent disk controller from Microcomputer Systems Corp. (MSC) now supports Digital Equipment Corp. PDP-11 systems running under the DEC RSX-11D operating system, according to the firm.

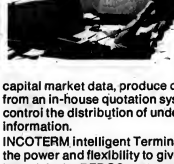
The microprocessor-based controller supports storage module devices with 25M- to 300M bytes per spindle. One to four drives of one type and capacity can be attached to a single controller, MSC said.

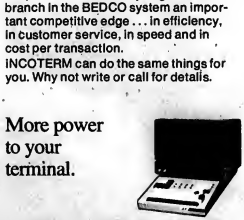
The unit's microprogrammed design permits it to respond as an RK11 or RP11 for bootstrapping purposes, allowing use of DEC's standard switch register or nonswitch register bootstrap read-only memories, the company said.

In addition, the controller can issue memory reference requests on the DEC Unibus, allowing it to fetch a command directly.

The controller/formatter and one host adapter costs $7,900, MSC said from 440 Oakmead Parkway, Sunnyvale, Calif. 94086.

How Blyth Eastman Dillon moves millions of dollars an hour:





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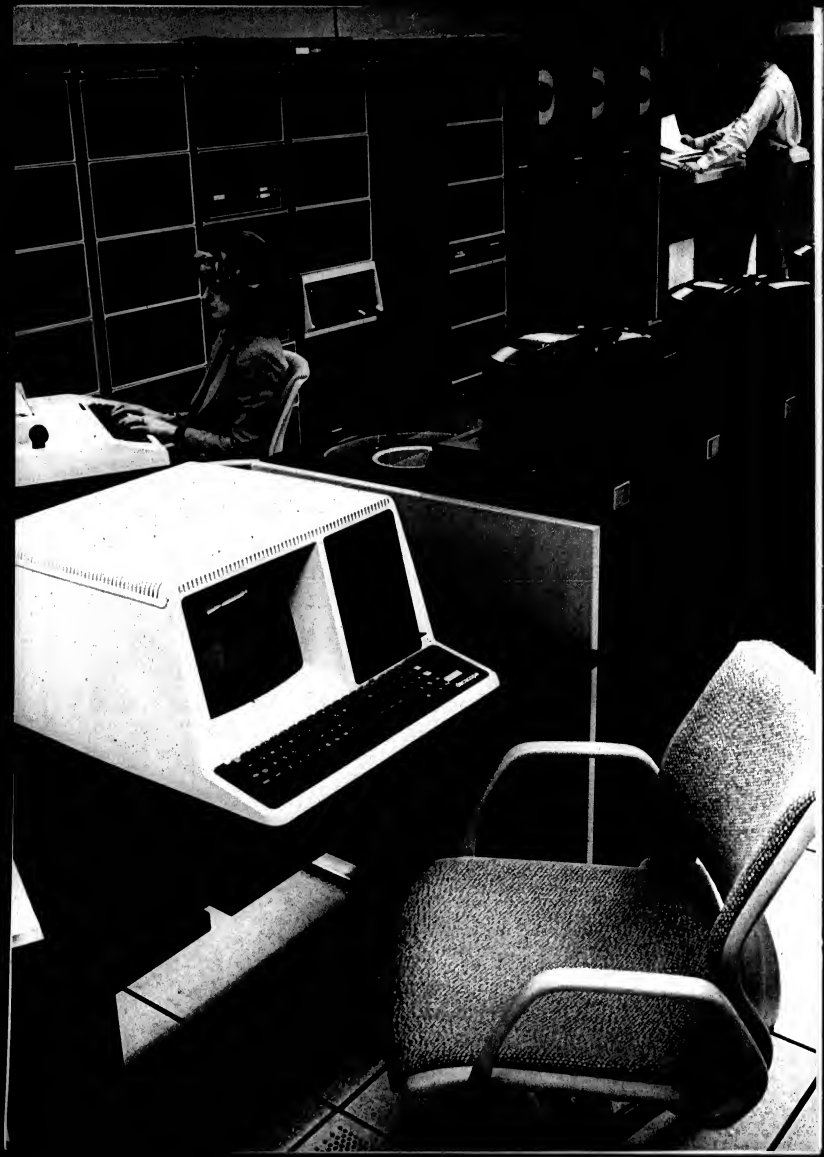

Here's why Digital's PDP-11/70 is the fastest selling supermini in the world.

In the short time that the PDP-11/70 has been offered, Digital has shipped over 1,000 of them. Customer applications include everything from laboratory research and education to extensive communications and commercial transaction processing.

What makes the 11/70 so popular? There are almost as many reasons as there are users. In conversations with a wide range of customers, four major reasons are repeated time and again: throughput, reliability, software and Digital itself.

"We went to PDP-11s initially because no other systems offered the price/performance. User response was so enthusiastic that we added more terminals and expanded to the 11/70. Our users love it. Reliability has been exceptional."... D.H. Casagranda, Manager, Corporate Systems, ATCO Industries, Ltd.

The 11/70 is a very powerful computer, designed throughout to handle more data far faster than machines costing 5 times as much. It's supported by an outstanding selection of software. And since it's made by Digital, you can expect the highest quality, reliability and support services.

"We have a highly challenging mix of computing requirements. The 11/70 has come through with flying colors."... Loren Gilmore, Corporate Manager of Engineering and Process Control Systems, International Harvester Company.

If you're wrestling with a mixed bag of computer needs, the PDP-11/70's your machine. It has an impressive variety of operating systems, languages, data management facilities and applications packages. It can handle real-time, timesharing and batch in any combination at the same time.

"We chose the 11/70 because it had all the tools we needed for a heavy transaction processing workload. And it's lived up to all our expectations."... R.E. Umbach, Manager, Intercom Systems, Walgreens.

More and more organizations need a system that provides fast turnaround of up-to-the-second information to dozens of users simultaneously. The 11/70 gives it to them: the operating systems, the database tools, the communications and the raw operating speeds themselves.

"The 11/70's power was impressive, but it was primarily the software that sold us."... Mel Culp, Systems Services Manager, Allis Chalmers Power Systems, Incorporated.

The PDP-11/70 comes with a choice of three major operating systems – IAS, RSTS/E and RSX-11 – that fit just about any operating requirements. Several languages, like COBOL, FORTRAN, BASIC, APL, DIBOL and RPG-II. And various data management systems, including multi-key ISAM and the only CODASYL-compatible Data Base Management System available in its class.

"There were only two companies that had the communications capabilities we wanted. On all counts the 11/70 was superior."... Royle Vagle, Director of Data Processing, Cooperating School Districts of the St. Louis Suburban Area, Inc.

Digital is ahead of everyone in the area of data communication capabilities. There's the DECnet software that lets you communicate with a broad range of Digital computers, from micros to maxis, and a wide range of interfaces, terminals and services.

"Reliability was a critical requirement, and we got it. We've had only one machine failure in six months."... Charles Holmes, Manager of Computer Services, Farinon Electronics.

Up-time, in fact, was one of the major goals in the 11/70's design. It started with the selection of the most reliable components tested under worst-case conditions. And culminated in a system where operations are continuously monitored by hardware or software. If you do have a problem, the 11/70 diagnostics and packaging make it one of the most quickly serviceable computers on the market.

"Digital had the system, the software, and the support. Their commitment has been solid from the outset."... Gary Bernstein, Manager, Computing Systems, Biomedical Engineering Unit, McGill University.

To support all our hardware and software, we've created one of the world's largest support organizations. 5,000 people in 300 locations worldwide provide the very best software, educational, and service support.

"It was an easy decision. Both Digital and the 11/70 had an excellent track record. And they've both lived up to it."... Raymond Neff, Director, Health Sciences Computing Facility, Harvard University School of Public Health.

For more information on Digital's PDP-11/70 call your local Digital representative. Or send the accompanying coupon.

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In November, 1974, a decision was made to enter the packaged software market. Several key software products were either acquired or developed by DASD Corporation for this purpose. It should be noted that all software products marketed by DASD Corporation are maintained and supported by our own technical staff.

Following is a small technical narrative covering the present software products we have available, a short profile of the branch offices, and the address and phone number for each of our branches.

Put your problems in our hands. We will put results in yours.

Software Products

LIBMAN

LIBMAN is a Tape Library Management System design to give you:

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- On-line inquiry and update.
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- No operating system "Hooks."
- No extra tape label date

The system runs on an IBM 370 computer under VS2 with TSO and SMF. You may use LIBMAN under a perpetual lease or monthly rental plan.

SIMBA

SIMBA saves you disk space and improves program processing efficiency by handling relative block BDAM datasets in a fixed block mode. Basically, SIMBA is a blocker/deblocker interface between your application programs and BDAM. Since you must provide "own code" deblocking or waste valuable disk space creating unblocked files when processing relative block datasets, you are usually faced with a need for an easy to use blocking/deblocking package.

DASDCMP

This is a Generalized File Utility designed to expedite programmer productivity during major conversion projects, parallel testing or regression testing where large data files must be compared to verify new program accuracy. The possible end print function, when a difference is sensed between two files, prints the file one record followed by just the differences for the file two record. Errors are quickly spotted. Control card parameters are accepted so you can compare specific parts of a record or ignore specific differences. Also file merging, match compare and print and print only functions are available. Records are printed in alpha and hex.

COBOL TO COBOL

System-3 COBOL is the input and 360/370 OS ANS COBOL is the output. This package is designed to save your programmers the boredom of changing 5000 select and FD statements the same way every day until your conversion project is done. Also specific differences such as COMP-4 (Binary) etc. are handled. Since the System-3 uses no printer carriage control character in front of the print line all print commands are replaced with a perform of a common print sub-routine which inserts the correct carriage control for 360/370 printing.

RPG/RPG II TO COBOL TRANSLATOR

This package accepts all types of RPG and produces ANS COBOL. Automatic editing, Chain Files, Exception Output, Sub-routines, Look Ahead Files, Force Files, Demand Files, Table Handling and Bit Operations are only some of the RPG features handled. The resulting COBOL program is modular in design (main driver perform sub-routine) and follows the basic RPG process cycle: Read, Process, Write. RPG date and procedure names are used without exception unless they are COBOL reserved words. Several client service options are available: Perpetual Lease, Conversion only, Clean Compile and full implementation including production JCL, test and installation.

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Run your 360/370 IBM computer without writing another JCL statement. That's right. JOL is a high-level compiler with a comprehensive macro processor. Basically, JOL is to JCL what PL1 and COBOL are to BAL. Your programming and operations staff write all of your job streams in a high-level easy to understand language. You start all of your jobs by submitting this high-level language to the operating system instead of JCL. JOL compiles your statements and creates JCL statements appropriate for your operating system and dynamically submits these statements to an internal reader for subsequent execution. JOL will have the same effect on your data processing environment that COBOL and PL1 had when they were introduced. By simplifying the development of OS job streams JOL will result in increased programmer productivity, optimized state of the art JCL creation and reduced job failure. JOL is easily installed and becomes an integral part of your operating system environment. It should also be noted that both JOL and regular JCL jobs can be run at the same time.

Contract Programming

Milwaukee

The largest and oldest DASD branch office is in Milwaukee, Wisconsin. The office is headed by Mr. Fred Snoody. Fred has held managerial and technical positions in the data processing profession for over 20 years. His marketing team, which includes himself and two other marketing representatives, has over 36 years of data processing experience. His 35 man systems and programming staff has over 200 years of experience in the field of data processing.

As with all of our branch offices, the marketing team is responsible for evaluating your contract projects and placing the right kind of talent on those projects. When you discuss a project with a Milwaukee Marketing Representative you will happily find that he thoroughly understands your needs. Your Milwaukee branch not only offers the kind of marketing team able to talk our needs, but also offers a systems and programming staff that can do something about your needs. The next time you have a data processing problem to solve, please call. You will be heard, you will be understood and you will get results.

Chicago

Chicago is DASD's second largest and also second oldest branch office. Mr. Ron McLarty manages the Chicago branch. Ron says Chicago is not going to be the second largest branch much longer. His marketing team, which represents over 30 years of experience in the field of data processing, backs up that statement 100 percent.

We are happy to have this kind of competitive spirit among our branch managers. Since performance, repeat business and happy clients are the kinds of things that make our branches grow, awarding your projects to the Chicago branch will result in the kind of professional service you look for in a company like DASD.

Chicago's software and services sales have increased significantly over the past year. In order to that Chicago had to provide their clients top quality service in a practical time frame for a practical price. When you want contract services call your Chicago branch. You will be glad you did.

Houston

Our newest branch office, and perhaps the fastest growing at the present time, is in Houston, Texas. Mr. Mike Maupin, who has 10 years experience in the data processing profession, is our Houston branch manager. Mike is also responsible for all marketing activities. His ability to listen to your needs, analyze alternate solutions and recommend a final course of action makes him an ideal candidate for this position. You will be well represented when talking to Mike about contract programming services.

To date, the Houston technical staff has over 33 man years of experience and is rapidly growing. High quality professional services, satisfied clients and a heavily experienced technical staff are the reasons for this growth. When you need contract programming services in the Houston area call Mike Maupin. He has the background needed to understand your needs, the experience needed to put the right kind of talent on your projects and the technical staff to deliver happy results.

Thank you for taking the time to read this ad. We sincerely hope your time was well spent. If you have no need for our services now, please tear out this ad and file it in your vendor file. You may want to call us in the future.

We should tell you that we are very willing to travel to your site. Many of our projects are in cities other than our branch locations. Our branch offices work together as a Corporate team to provide National coverage for all of our clients. One branch will draw special talents and extra help from the other two to deliver on a contract. What ever it takes. We do it. Your satisfaction is our satisfaction.

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COMPUTER INDUSTRY

CI Notes

Sycor Signs Accord to Buy Into European Companies

ANN ARBOR, Mich. — Sycor, Inc. has signed a memorandum of understanding to acquire a majority interest in a group of European computer machinery companies.

The terms of the transaction were not disclosed.

After the sale, Sycor will be the majority shareholder in a holding company that owns a minority interest in Computer Machinery Co. of Britain and majority interest in CMC France S.A. and Computer Machinery Deutschland GmbH.

Definitive action is expected in March. Until then, the three European concerns will distribute the Sycor 400 series of products.

Ing. C. Olivetti & Co. SpA will continue to distribute Sycor's 200 and 500 series product lines.

Shugart Granted Two Patents

SUNNYVALE, Calif. — Shugart Associates has been granted patents on two of its pending applications covering the Shugart Minifloppy drive and Minidiskette.

The patent covering the playback circuit used in the drive will be issued in early March, according to the firm, and a media patent will be issued shortly thereafter.

Shugart has other patent applications pending which cover the technology used in the drive.

Two Drop Centronics Suits

HUDSON, N.H. — Centronics Data Computer Corp. has announced that all antitrust and other claims brought by Core Computer Related Equipment GmbH and Core Computer Related Equipment Ltd. against Centronics in U.S. courts have been dropped.

Centronics' suit against its two previous European distributors is still pending [CW, July 30, 1975].

Supershorts

Siemens-Albis has been appointed exclusive distributor for the Vocal Interface Division of Federal Screw Works' Votrax product in Switzerland.

Data General Corp. has shipped its first Nova 3/D to the Conrad Division of U.S. Industries.

$22 Billion in '85 Predicted

EFT, Electronic Mail Marts to Overlap

By Toni Wiseman
Of the CW Staff

NEW YORK — Even though the electronic funds transfer (EFT) system market presently represents a major market in itself, by 1985 it will begin to overlap the expanding electronic mail market as executive terminals for EFT within corporations incorporate message transfer features so the end user can receive combined services.

That was one of the foremost conclusions of an extensive, year-long study conducted by Quantum Science Corp. The research firm released key conclusions of the study at a press conference here last week.

"The total market for electronic transfer systems and services will reach nearly $22 billion by 1985, compared with a current market of less than $5 billion," Quantum said.

Almost 80% of this market will be in the retail and banking industries as computer systems are developed to facilitate the handling of transactions, it said.

Point-of-sale (POS) and credit verification terminals will constitute the largest segment of the EFT market, reaching a $1.8 billion level by 1981, the report found.

Government Must Act

In order to foster the growth of electronic transactions markets, the federal government must take the proper posture on policy issues affecting that market, Quantum indicated. It recommended, for example:

- "Branch banking through [automated teller machines (ATM)] should be fostered through federal legislation.
- "Liability for EFT [system] errors must be established on a nationally uniform basis."
- "The privacy of financial transactions, credit information and electronic mail transmissions must be assured."
- "The second Computer Inquiry and other [Federal Communications Commission (FCC)] decisions cannot be allowed to hinder the evolution of new competitive offerings."
- "Congress must be dissuaded from enacting protectionistic U.S. Postal Service legislation which would impede electronic mail growth. Both [Postal Service] and electronic systems should be allowed to seek their own independent levels."

The scenarios for EFT and that for electronic text and graphics transfer systems (ET/GTS), or electronic mail systems, will be quite different, Quantum pointed out.

The EFT market is forecast to reach $18 billion by 1985; ET/GTS will reach only $4 billion that year. EFT is heavily regulated by both state and federal bodies, as well as being subject to consumer pressures; with the exception of the U.S. Postal Service's role, ET/GTS is only regulated by the FCC in the classical sense.

Competition for both segments will come from the same large companies, however, the report said.

Quantum found its key conclusions regarding EFT were confirmed by the study:

- "Electronic systems will reduce the direct labor component and have appeal to retailers and banks alike."
- "At 30 cents each, checks will continue to be an expensive burden for banks. Electronic alternatives are desirable."
- "The existing technology is adequate for present EFT [system] networks; new inventions are not required."
- "Eased branching regulations will spur ATM growth, but the market will reach only $139 million by 1981."

For electronic funds transactions systems (Quantum prefers the term transaction because it has broader implications than transfer), the retail market represents the major opportunities, since there is very little saturation to date.

Banking, on the other hand, is a relatively mature market, with already well-defined competition; the savings & loan terminals market, for instance, is almost totally saturated, the study found.

The EFT evolution began in the 1967-1969 period with early systems from Singer and NCR. Today, transaction-oriented POS terminals, credit card/verification systems and credit data base management are all a reality, Quantum said.

In the last year, debit cards have begun to evolve. These however will not be a success as a separate entity, in Quantum's estimation, but rather will merge into a transaction card.

(Continued on Page 52)

IBM Moves Cut Memorex Return On 3670 Family, Navas Testifies

By Molly Upton
Of the CW Staff

NEW YORK — Memorex Corp. failed to realize the anticipated rate of return on investment on its 3670 family of disk products as a result of IBM pricing and product moves and Memorex's attempts to counteract them, according to John Navas, formerly a member of the Memorex Product Management Group.

The rate of return on investment on the 3670 series was "marginal" — 10% to 20% — compared with the firm's target of 20% or better on products installed over a five-year period, he testified recently at the U.S. vs. IBM antitrust trial here.

Navas enumerated some of the revenue reductions Memorex incurred and strategies it undertook to protect its base. The 3670 was Memorex's version of IBM's 3330.

After Memorex announced its 3671 controller, it felt compelled to reduce the price by about $500 to $1,300/mo on a two-year contract in order to be competitive with IBM, which in August 1971 announced an integrated storage controller (ISC) with a price of about $1,250/mo, he said.

Previously, IBM controllers such as the 3830-1 had rented for about $2,400/mo, Navas added.

The price cut was partially responsible for the reduction in revenues Memorex realized from this product, he said.

But Memorex's marketing strategies also contributed to the decline, he indicated. Memorex was reluctant to widely quote the low price and told its marketing force to lay low while it worked down its backlog of orders at the original price, he said.

During this time, Memorex quoted the low price only to those prospects which were also considering the ISC. Not until the second quarter of 1973 did Memorex widely adopt the lower price, Navas said.

The smaller than anticipated shipments also helped reduce revenue generation, he said, noting orders dropped by about half in the second half of 1973 compared with the end of May that year.

In one case, Memorex knowingly launched a product with about zero profitability in an attempt to protect its in-

(Continued on Page 50)

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IBM Won't Say It, Auerbach Will:

Series/1 Is IBM Entry Into General-Purpose Minis

PENNSAUKEN, N.J. — "The introduction of the Series/1 indisputably marks IBM's entry into the general-purpose minicomputer market," although IBM avoids that designation when referring to the system, according to Auerbach Publishers, Inc.

"IBM has sprinted to remain competitive in the peripheral offering of the minicomputer manufacturers," Auerbach concluded in its recent analysis of the Series/1.

IBM seems to offer peripherals that cost less than comparative peripherals offered by the mini makers, Auerbach said, but this conclusion must be tempered by several factors.

"Two are that IBM does not offer OEM discounts and that often individual peripheral devices have special features that make direct price comparisons difficult.

"At this early stage" the key to the Series/1 announcement "seems to reside in the system's data communications capabilities . . . Nearly every major general-purpose computer, minicomputer and terminal manufacturer can offer flexible data communications products for networking, either in traditional async or bisync protocols or IBM's own [Synchronous Data Link Control (SDLC)] protocol.

"The irony of the matter is that up until the announcement of the Series/1, IBM did not have a general-purpose processor that could be incorporated into an SDLC network," Auerbach said.

IBM would like to sell the system on a multiple-unit basis as front ends; intelligent, interactive terminal/remote job entry systems; communications concentrators and multiplexors; and as message-switching systems, it added.

Auerbach noted that IBM is most probably adopting a "wait-and-see" attitude toward the minicomputer marketplace, similar to the one it took with the introduction of the System 7.

The System 7 "was originally introduced with configuration and software restraints that made it almost totally dependent on an IBM host mainframe . . . Not only will the Series/1 take up where the System 7 left off, but all indications point to the retirement of the System 7," Auerbach said.

New Marketing Tack

The Series/1 also represents a departure from IBM's traditional marketing philosophy, according to Auerbach. Rather than discouraging the attachment of independent peripherals, IBM is encouraging the interfacing of any user-selected devices and foreign systems, the publisher said.

"Most likely, in its first year on the market, there will be some skirmishes between IBM and the mini vendors, but no major battles," Auerbach predicted.

"The IBM Series/1 is a futures' product that will keep Digital Equipment Corp., Data General, Hewlett-Packard, Interdata and Varian on guard, but for the present the lack of an OEM discount policy and supporting software mark the Series/1 as a product with a narrow market segment," the analysis indicated.

Memorex 3670 Hurt By IBM Moves: Navas

(Continued from Page 49)

stalled base and provide for further market growth, Navas said.

The 3672 controller was built basically as a model for 3671 field upgrades that cost between $2,500 and $4,000 per site and had nearly zero profitability, he said.

But it provided direct connection to IBM 370s via a selector channel that looked like a block and allowed users to exceed Memorex's previous limit of eight drives per controller. It also provided microcode support for the 3675, a 200M-byte drive, he said.

The 3672 was basically an "investment defense program" to protect Memorex's 3671 base, Navas commented.

But customers were skeptical of having Memorex modify their IBM operating systems to accept the 3670 on a selector channel, he added.

The rate of return on investment from the 3673 controller was 20%, he said. The 3673 interfaces to the integrated file adapter and ISCs of 370s.

In addition, reduced revenues and lack of outside financing in 1973 caused the firm to cut its production to about half of what it felt it could have placed, Navas commented.

Because of the capital constraints, Memorex did not undertake development of any products that were not started by the third quarter of 1973, or after the 3672, -3 and -5, he stated.

Reacting to other IBM pricing/product moves, Memorex cut its controller price on the 3660 subsystem by about one-third for those 370/135 and 145 users signing up for three years.

In combating IBM's Fixed Term Plan, Memorex evolved a Data Base Plan which Navas said was intended to be the conversion bridge between the 2314 and 3330 for those wanting the forthcoming 3670.

The plan offered a rental reduction for customers who installed 3660s as an interim measure until 3670s could be delivered. This plan also cut lease base revenue generation from that originally anticipated, he said.

Modcomp Reorganizes

FORT LAUDERDALE, Fla. — Modular Computer Systems, Inc. has restructured its management organization.

Under the new structure, four functions — business management; customer operations, which consists of worldwide sales and customer service; finance and administration; and engineering and operations — report directly to Modcomp's president, Kenneth G. Harple.

The most significant change is the creation of a business management organization consisting of four groups, each responsible for the development and implementation of a business plan for respective market areas and a product planning group, according to Harple.

The business management groups include measurement and control, communications, OEM and business systems.

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Cullinane Emphasizing Complete Data Management

By Toni Wiseman
Of the CW Staff

WELLESLEY, Mass. — It's not surprising that the people of Cullinane Corp. have smiles on their faces looking back on 1976, a year in which sales jumped to $3.2 million and its Integrated Data Base Management System (IDMS) held a commanding spot on Datapro Research Corp.'s Software Honor Roll.

"In the Datapro study on data base management systems, IDMS did well, while IBM was last," John Cullinane, president, pointed out.

"We can already see signs that this will have a tremendous impact on our business, because for the first time the technician or user who has decided IDMS is best has some ammunition to take with him to convince management," he said.

Over the last three years, Cullinane said he could count at least 50 situations where IDMS was chosen by the evaluation team, "but IBM came in at the management level and convinced them to go to IBM through its usual scare tactics — 'We'll always be around, we're big, we have a large service force.'

"We're seeing the impact right now. People who couldn't seem to make a decision are now falling our way," he said.

Commenting on the impact the Datapro study would have on the DP field in general, Cullinane said that if IDMS had led the field in only two or three categories, the effect might not be too great, "but being first in six out of seven categories is a pretty convincing argument."

IBM remains Cullinane's main competitor, but nevertheless the company had sales of $3.2 million in 1976 and expects to grow to $5 million this year. Profits before taxes were $500,000 last year, a figure Cullinane expects to exceed $1 million this year.

Some $2 million of 1976's revenues was associated with IDMS and $1 million was associated with Culprit and Auditor, he said. In 1977, however, IDMS should account for close to $4 million, while Culprit and Auditor contributions should amount to about $1.2 million, he said.

CDMS Main Thrust

Cullinane's main thrust today is towards the Complete Data Management System (CDMS) with single vendor support.

"The key to success," Cullinane said, "is our competent people, but also being responsive to the marketplace, doing what the users want and enhancing the system to meet their requirements."

And one of the things users want is a complete data management system, as opposed to a data base management system (DBMS), from one source, he believes.

CDMS includes data base management through IDMS, data and program management through the integrated data dictionary facility, teleprocessing through IDMS-DC, inquiry/response through On-Line Query and information retrieval through Culprit output processors. It also includes EEO-Reporter and EDP-Auditor.

In addition, Cullinane is offering a back-end DBMS, distributed data base management and IDMS-11, products on the R&D cutting edge of technology, according to Cullinane.

Digital Equipment Corp., for instance, has acquired IDMS-11 as the standard DBMS for its PDP-11 series. The package has gone through beta testing and was formally released Dec. 31.

IDMS-11, a direct copy of IDMS, is very attractive to users who have an IBM 370 and are planning to get a DEC PDP with some data base management on it. This means they can have the same system on both machines, Cullinane said.

The back-end DBMS concept has already been sold to four government agencies, he noted, where a PDP-11/70 will be interfaced with a 370, with the DBMS function handled by the mini, a concept which clearly lends itself to distributed data processing and sharing of data bases, he added.

"Data base management is an overhead function, so a user with a 158 may find it economical to get a mini to run the data base function rather than get another 158, for instance," he said.

The back-end DBMS, distributed DBMS and IDMS-11 are all things which people have been thinking about and would like to do in two or three years if they find it feasible, he stated.

These concepts become particularly attractive when the complete system is available from a single vendor, he added.

Cullinane attributed a large part of his firm's success to its marketing concept for IDMS. While "traditional salesmen handle the Culprit side of the business, area managers are in charge of IDMS.

"The difference between our approach and IBM salesmen is the technical competence of the people," Cullinane said, adding the area managers have the know-how to install a system on the spot without assistance from technical personnel.

NCR Sues Former R&D Manager To Halt 'Trade Secret' Disclosure

DAYTON, Ohio — NCR Corp. has filed suit in Superior Court in San Jose, Calif., against McDonnell Douglas Corp. and Dr. Wendell Spence, a former NCR employee.

The suit seeks to enjoin Spence from disclosing "confidential information" and "proprietary trade secrets" and to enjoin McDonnell Douglas from using such information.

Spence was formerly R&D manager for NCR's Microelectronics Division and had access to proprietary information about metal nitride oxide semiconductors (MNOS) and electrically alterable read-only memory (Eatrom), according to un NCR spokesman. Both have application in the area of nonvolatile semiconductor memories.

In his present job as senior engineer at McDonnell Douglas' Nitron division, Spence is in a position to disclose this information, the spokesman added.

A temporary restraining order was issued Feb. 3 pending a further hearing on the issue.

General Instrument Corp. (GI) also filed suit in the same court on the same grounds. NCR licensed its MNOS to GI in 1975, for use by GI in producing a solid-state, push-button tuning device for televisions.

NCR has also licensed exclusive rights to manufacture two models of Eatrom devices to Mitsubishi Corp. in Japan.

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A Concept in search of a Definition

Computerworld presents a special report on Distributed Processing in the March 28th issue.

Computerworld's next special report will explore the wide open world of distributed data processing, starting with the hardest problem of all: defining what these buzz words mean. We'll have experts on hand to tell us, in their own words, just what constitutes a distributed processing system, and what does not. They might not agree, of course, but it should make enlightening reading for just about everyone.

Edited by Ron Frank, this special report will include a variety of information on distributed data processing:

- Case histories — the decision, development process and results
- User commentary and analysis on distributed systems
- Changes you'll have to make — in hardware, software, communications and personnel — when converting to a distributed environment
- Cost/performance choices when adapting your hardware and software
- Configuring an off-site communications network for a distributed system
- Cost/performance options in line costs, line speeds, and communication equipment
- Personnel — the effect of distributed processing on management; will "Regional DP Managers" be necessary to maintain corporate control?
- Computer Security — does the risk to your organization grow in proportion to the points of access to your data file? Safeguards you can use
- Who's going into distributed processing — a profile of the "prime candidate" for conversion

In all, *Computerworld's* March 28th report could help you make an informed decision on what some are calling the "wave of the future", and what others think of as three confusing words. So if you'd like to consider the benefits of a distributed system, or if you already have one, be sure you read the March 28th *Computerworld*. If you market equipment that's designed for or can be adapted to a distributed environment, you should put your advertising here (where it'll do the most good). Don't miss the March 11th closing date. Contact your *Computerworld* salesman for complete details. Or call Judy Milford at (617) 965-5800 to place your ad.

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EFT, Electronic Mail Markets Seen Overlapping by '85

(Continued from Page 49)

Transaction networks are beginning to evolve in commercial and savings & loan banking and will continue to do so, but only on a regional basis until the early 80's, at which time a national switch will evolve, the report predicted.

Quantum does not see a "checkless society" evolving in the next few years and possibly not until the next century.

POS terminals will pace the hardware market with a 14.5% annual growth rate through 1981, reaching $800 million in 1981, Quantum predicted. ATMs are a short-term opportunity, it forecast, adding that legislation declassifying ATMs as branches will come within the next two years.

Banking indicators are negative for EFT, however, the Quantum study found:

- "Banking EFT [system] networks are proving uneconomical for retail applications."
- "Large commercial banks will not be successful in marketing proprietary networks to smaller banks."
- "Banks cannot compete with major hardware or communications companies in marketing retail networks."

Competition Foreseen

Quantum sees competition for the EFT market coming from communications companies (Western Union, AT&T, ITT, GTE, Satellite Business Systems), equipment companies (IBM, NCR, Burroughs, TRW, Bunker Ramo) and services companies (Control Data Corp., System Development Corp., TRW, bank consortiums and government).

In the electronic mail arena, existing factors will merge to create a new market, the firm predicted. These functions are currently handled by stand-alone text-editing terminals and facsimile devices.

Quantum predicted electronic mail printers with integrated facsimile will be available within the next two years from IBM, noting that ink jet technology will be the one to drive the high-speed electronic mail/printer market since it is the most cost-effective solution.

The largest opportunity in the ET/GTS marketing is in equipment, the study found, with annual shipments reaching $1.7 billion by 1981 and $3.5 billion by 1985.

The second largest opportunity will be in the communications area when value-added services for text processing and distribution (electronic mail) are added to text/graphics, store and forward and network compatibility services.

"Network design and management opportunities in electronic mail will parallel the remote computing market of the late 1960s," Quantum stated.

Total user expenditures in the ET/GTS markets, including communications, services and equipment, were $255 million in 1976. That figure is expected to rise to $2.1 billion in 1981 and then to $3.9 billion by 1985, the firm forecast.

In terms of the competitive environment, the ET/GTS scene has a number of additional companies vying for a piece of the market. They include Telenet, 3M, Xerox, Texas Instruments, the Postal Service, Bowne Tymshare and Computer Sciences Corp.

The U.S. Postal Service will have little voice in electronic mail, Quantum indicated. It will not build its own network; if any such network is built, however, it will be in conjunction with others, similar to the arrangement the Postal Service now has for Mailgrams, it said.

The government will not legislate against the provision of electronic mail services by independent firms such as AT&T, Quantum said, despite the fact that the study showed the development of electronic mail as a parallel service to the Postal Service will cause the Postal Service to lose some 7% of its first class mail revenue in 1981.

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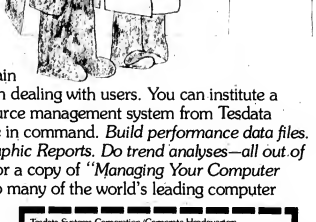

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Acquisitions

United Computing Systems, Inc. has agreed to acquire **London University Computing Services, Ltd. (Lucs).** Under the terms of the agreement, Lucs will operate as a wholly owned subsidiary of United Computing.

Informatics, Inc. has agreed to acquire **Management Horizons Data Systems.**

Escom, Inc., a minicomputer distributor and software services firm, has acquired **Infocomm,** a company engaged in similar business activity based in Anchorage, Alaska.

Data Devices International, Inc., manufacturer of magnetic media maintenance products, has acquired the winder/cleaner/certifier product line of the **Mincom Division** of 3M Co.

Computer Horizons Corp., specializing in systems design programming and turnkey minicomputer business systems, has acquired **VMF Industries, Inc.**

Data Dimensions, Inc. has agreed in principle to acquire all the assets and business of **International Computer Equipment Corp.** and **National Terminal Corp.**

But That May Change

Study Finds Software Lagging in Japan

TOKYO — The Japanese software industry lags significantly behind that of the U.S., but recent developments are helping that segment gain recognition as a separate branch of the DP industry, according to a report by the Research Division of Fuji Bank, Ltd. here.

"Quantitatively as well as qualitatively, the Japanese industry is far behind the U.S., where the production of software as a separate field developed earlier. The gap is particularly large in the development of programs for users," the report said.

Figures for 1974 show software accounted for about $33.2 million or 6.2% of the total Japanese computer market. In the U.S., software sales totaled $792.2 million, or 24% of total market.

While the U.S. software industry benefited greatly from government agency development contracts, the Japanese industry was hamstrung by the emphasis placed on hardware to the detriment of software, the report said.

In Japan, intangibles are not considered marketable products unless they possess clear legal protection, such as a patent or copyright. It is therefore difficult to create a market for software, which has no special legal protection, the Fuji report noted.

International News

In addition, because many of the enterprises using software are greatly concerned about protecting company secrets or because they do not fully realize the capabilities of software companies, they cling to the in-house development of programs they need to supplement vendor-supplied operating systems, the report said.

"Hence, a system in which the basic program was developed by the manufacturer and the applied programs by the user became the standard procedure so there was little room left for enterprises offering ready-made programs or software," it added.

Easing of Status Quo

The status quo has been eased somewhat, however, by recent developments including the availability of patents for software — though for the time being they are limited to programs for numerically controlled machine tools, the Fuji report noted.

In addition, the Ministry of International Trade and Industry made available $1 million in subsidies in 1973 for the development of a general-purpose program in order to promote the Japanese software industry.

In fiscal 1976, a plan was adopted to raise the level of Japanese software production technology in the next five years, Fuji pointed out.

Finally, during the last recession, "the attitude of users to ready-made programs underwent a certain change.

"Instead of employing permanently highly paid systems engineers and programmers, enterprises found it more economical to buy programs that were equally satisfactory.

"This shift to the use of programs offered by the software industry may become stronger in the future," the Fuji report predicted.

Since the establishment of a software enterprise does not require a large amount of capital and only a few systems engineers and programmers, there is a danger of an industry comprised of numerous small, weak enterprises springing up in Japan.

General Purpose Packages

Should the market come into its own, customized orders will be replaced by the demand for general-purpose packages. These will have to be very comprehensive to meet the varied needs of an undetermined number of prospective users, the report noted.

The development of general-purpose packages therefore requires large amounts of capital and involves considerable risk, making it difficult for small firms to compete, it said.

Finally, the impact of the liberalization of foreign capital investment, adopted last April, must be taken into account.

"In order to cope with the effects of the liberalization, the government has taken the initiative in organizing joint development projects and in strengthening cooperation between private software enterprises," Fuji's Research Division found.

But there is no comparison between U.S. firms' accumulation of know-how and [their] ability to develop new programs and that of Japanese enterprises, it said.

"It is expected that, with the growth of the Japanese market, American enterprises will try to enter this market with software adapted to Japanese conditions," the report stated.

DP Dominates Spanish Market

MADRID, Spain — Telecommunications and computer equipment remain the two largest markets for electronics equipment in Spain, according to a report issued by the U.S. Department of Commerce.

In 1975, telecommunications consumption amounted to $668 million and computer equipment $290 million while, overall, professional electronics products consumption was $1.2 billion. This compared with a 1974 figure of $1 billion.

In terms of production, professional electronics was not uniform for the year, according to Commerce. While output of defense and broadcasting equipment fell, data treatment items such as computers experienced an almost 60% increase over 1974.

The single most important imported item was computers and peripheral equipment, accounting for over 40% of all electronics imports for 1975.

In spite of the government's vigorous activity to reduce this import, notably the recently formed domestic computer manufacturer Secoinsa, imports will continue to supply the bulk of the demand for these items for several years to come.

Secoinsa is a joint venture of the Japanese firm Fujitsu, the Spanish National Telephone Co. and other partners. Secoinsa will manufacture small/to medium-size computers in Spain.

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Request for Proposal No. 282 for the purchase of 3 Univac Data Line Terminal Type 3 (DLT-3) to enable Univac 1004's to function as RJE terminals.

Request for Proposal No. 283 for the purchase of a real-time performance evaluation software package to evaluate system and user program execution plus peripheral usage under IBM OS/MVT or MVS.

Request for Proposal No. 284 for the purchase of a software product that will simplify the implementation of on-line systems using IBM's CICS/OS or CICS/VS.

Request for Proposal No. 285 General bid for remote job entry stations for the State of Mississippi to connect to IBM 370/155's running under OS/MVT HASP or MVS.

Detailed specifications may be obtained from the CDPA office. The CDPA reserves the right to reject any and all bids and proposals and to waive informalities.

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Central Data Processing Authority

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VPFB the Bolivian state owned oil company invites all interested companies to submit documentation for qualification for EOP consultancy. Those companies that meet the qualifications criteria will be invited to present bids for the company, EOP project to be carried out in Bolivia. The project involves:

- The implementation of a materials control system where the programs have already been developed.
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- Streamlining of the flow of information between H.WO., division offices and field.

Documentation portfolios will be accepted until 1800 hrs. (CST) of Tuesday the 1st of March 1977 at the following address:

V.P.F.B.
3334 Richmond Ave. Suite 105
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Attn: Gloria Alverado

The company currently owns two medium size IBM 370/115 systems and is in the process of expanding them.

A minimum of one person assigned for a period of one-two years will be required.

NOTICE OF SALE

NOTICE IS HEREBY GIVEN that a public sale of the property described below will be conducted by the undersigned on February 28, 1977, at 2:00 P.M. at the A.P. Giannini Auditorium, Bank of America Center, 555 California Street, San Francisco, California. Said sale will be conducted on behalf of BANK OF AMERICA NATIONAL TRUST AND SAVINGS ASSOCIATION ("the Secured Party"), to foreclose, pursuant to Section 9504 of the California Uniform Commercial Code, its security interest in the property described below which has been repossessed from the owner, Surety Industries Inc. ("the Debtor").

PROPERTY DESCRIPTION

1. Forty-two (42) Data Entry Systems (key-to-disk) manufactured by General Computer Systems, Inc. of Addison, Texas during the period of 1973-1975, including appropriate controls and interfacing equipment.

Each Data Entry System is comprised of a Computer Automation minicomputer with between 32K and 128K bytes of memory; 8 to 64 local or remote data entry stations (CRT); 1 to 3 fixed head or moving head disk storage drives, and, in some cases, additional card reading, magnetic tape, and line printing devices with appropriate controls, communications adapters and software.

Approximately 75% of the equipment is currently on-lease with end-user customers and is being maintained under manufacturer's maintenance agreements. On-lease equipment will be sold "as is," subject to the rights of lessees under the leases.

2. Twenty-nine (29) leases or parts of leases covering the General Computer Systems, Inc. computer equipment described above. As of December, 1976, these leases generated rental income in the approximate aggregate amount of $129,000.00 per month, and had a remaining term of between 1 and 36 months.

3. All of the Debtor's interest in and rights under two Master Sales Agreements between the Debtor and General Computer Systems, Inc. and certain Maintenance Agreements between General Computer Systems, Inc. and the computer equipment lessees. Said agreements require General Computer Systems, Inc. to make certain and to make certain efforts to remarket the equipment presently on lease. No representation or warranty is or will be made that the Debtor's interest in such agreements is transferable, that any rights of the Debtor or any transferee under such agreements are or will be enforceable against any party to such agreements or are not subject to deduction or offset, or that General Computer Systems, Inc. may not claim a substantial portion of the future rentals under the leases.

4. All of the Debtor's right, title and interest in or arising out of computer lease indemnity insurance evidenced by policies issued by Lloyd's Underwriters and others insofar as such policies relate to the equipment and leases described above and any claims under such policies. No representation or warranty is or will be made that the Debtor's interest in or assured under such policies is transferable, that the insurers have become liable under such policies, or even if any such liability exists, that the Debtor is the party entitled to make a claim under such policies.

PARTIAL LIST OF LEASES

A detailed list of system components, copies of the standard form leases, and copies of the purchase agreements, maintenance agreements, and the insurance policies described above are available for inspection prior to sale. Information may be obtained by contacting Mr. Warren L. Prostrollo, Jr., Personal Finance Officer, Bank of America National Trust and Savings Association, P.O. Box 37000, San Francisco, California 94137, (415) 622-4530. The sale may be in bulk or in parcels at the Secured Party may elect and shall be without warranty of any kind, express or implied. Pursuant to Section 9504 (4) California Uniform Commercial Code a purchaser will succeed to the rights of the debtor in the property and any subordinate liens or security interests therein will be discharged. The Secured Party reserves the right to reoffer property by any bidder to be in cash, by certified or cashier's check or in any other form and reserves the right to bid on all or any part of the property being offered. The sale will be with reserve and may be cancelled or continued from time to time as to all or any part of the property being offered.

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BSP Using Basic/Four Sales Strategy

By Molly Upton
Of the CW Staff

IRVINE, Calif. — Once an entrepreneur . . . ?Al Cosentino is at it again, this time with Business Systems Products, Inc. (BSP), a firm he founded in February 1976 after leaving Basic/Four, where he had been president and chairman.

Cosentino admits he is using the Basic/Four approach: Sell to the small business user through both direct sales and dealerships and offer applications software through its own facilities or software contractors.

But there are differences, he pointed out. BSP's product, the Adviser, an on-line, interactive multiterminal system [CW, Oct. 25], can grow with a customer and is suitable for distributed processing applications.

George Erickson, vice-president of marketing, said the firm intends to provide its own service.

Cosentino and Erickson explained that Advisor, with its 24-terminal capacity, is larger than Basic/Four's 700 and offers users the ability to upgrade without trading in their current system, as was the case with Basic/Four.

In addition, they said, the system was designed for greater reliability. Adviser uses a Computer Automation, Inc. mini and CRTs and Diablo top-loading disks which are placed alongside the CPU under a table top.

This eliminates disk failures caused by heat from the CPU and from torquing, Erickson said.

Three Positions

Cosentino was one of the original group that directed Management Assistance, Inc., into DP.

He then moved to found Sorbus, a subsidiary, and later transferred to Basic/Four where, under his tutelage, the money-losing corporation became profitable.

Both Erickson and Cosentino regard BSP as a great chance to start over again, having learned from experience at Basic/Four in selecting components.

They were not bound by the restraints of having a large installed base, they said, and went through exhaustive appraisals of components for their system.

The Adviser has up to 306K of main memory that is accessible by the user out of a total of 1M byte, Cosentino said. Disk capacity ranges from 10M- to 640M bytes.

BSP's target market is the small to medium user, which includes users obtaining their first systems and those who may have outgrown their current units.

Cosentino admitted Basic/Four users might fit the latter category, and he said "if there's a need and we can fill it, we won't walk away from it."

Name Change

Cosentino founded the firm as Business Systems Advisers, a consulting firm, while investigating the product configuration.

A product prototype came out in August and the system was announced in October. The firm changed its name to reflect the product aspects of the business. There has already been sales activity, he said.

Of the 10 employees, many were formerly at Basic/Four. Between the six principles, there are 126 man-years of experience in the DP business, Cosentino remarked.

Karl Gates, formerly national sales manager for Basic/Four, is executive vice-president; Guy Gugliotta, formerly director of product development, plans and programs at Basic/Four, is BSP vice-president of technical operations.

Calvin Eberle, who had been manager of development engineering at Basic/Four, is now BSP's vice-president of engineering.

Seminars on Preparing RFPs Set

WASHINGTON, D.C. — Planning, writing and executing government procurement solicitations will be the focus of a two-day conference here Feb. 24-25 and in Los Angeles April 14-15.

The conference will be co-sponsored by the American Institute of Aeronautics and Astronautics (AIAA) and the Technical Marketing Society of America (TMSA).

Topics will include general guidelines for request for proposals (RFP) preparation, uniform procurement packages, preparation of the technical section and reliability and maintainability in the RFP.

The fee for the conference, which will be held at the Sheraton-National in Washington and the Pacifica Hotel in Los Angeles, is $225 for members of the general public, $200 for AIAA/TMSA members.

Further details are available from AIAA at Suite 1403, 444 W. Ocean Blvd., Long Beach, Calif. 90802.

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Tape Drive Choice Seen Tougher for System Designer

COSTA MESA, Calif. — The speed and throughput of tape drives have increased dramatically over the past five years commensurate with minicomputer capabilities, but OEM system designers have a tougher job of selection because the low performance end is still the best choice for some applications, according to Darell Meyer.

"Five years ago, minicomputer capability limited the selection of tape drives in performance from a data transfer rate of 10- to 30 kbyte/sec," the tape product manager for the Pertec Division of Pertec Computer Corp. said here recently.

"Today the throughput capability for some minicomputer systems is up to 200- to 750 kbyte/sec. But for individual applications, the system designer might have good reason to choose a transfer rate anywhere on the performance spectrum," he added.

Meyer said that the bulk of the minicomputer applications still calls for tape speeds in the 30- to 50 in./sec. range, although many users are looking to implement tape units that operate at 125 in./sec.

The problem in minicomputer applications is that tape drive performance is often throughput-limited, he explained.

"Many system designers are now looking to group code recording (GCR) techniques. However, due to throughput limitations, tape speed is limited to around 25- to 50 in./sec. for most systems," Meyer added.

Reviewing the status of tape drive development and its effects on system architecture, Meyer noted that while 7-track drives are still being used, they are on the decline and represent only about 3% of the total tape drive market. The industry trend is definitely toward 9-track recording, he said.

For those who need 7-track drives to accommodate existing libraries and interchange compatibility, the result is likely to be higher cost for 7-track units in the future because of declining volume combined with increasing raw material and overall labor costs, he said.

Nine-track phase-encoded (PE) recording techniques have become the most popular for new systems, Meyer claimed. The latest industry trend is to combination PE/GCR drives and Pertec is starting to see demand following the industry trend.

There is a decline in 9-track NRZI recording, Meyer pointed out, although tape drives that offer both PE and NRZI are on an upward climb. Designers can achieve simplified system architecture with this dual capability and can offer customers a choice of interchange media on the same system with only one tape drive.

Prices Flattened

As for pricing, Meyer said that while the average tape drive price declined in the past, the trend has flattened. The price trend has reversed with slight increases occurring.

The user, however, is getting much more performance and reliability for his money and that trend will continue, Meyer noted.

Referring to added features and improved reliability, Meyer claimed that were a supplier to design today a tape drive designed five years ago, that unit would not be accepted today. Both the users and suppliers of minicomputers have become more sophisticated, he said.

Operator convenience, operational efficiency, ease of maintenance and overall cost of ownership are vastly improved in contemporary tape drives, he added.

New units offering 6,250 bit/in. density will be more expensive than current 1,600 bit/in. units, but will offer inherently better reliability within the GCR structure, in addition to the improved throughput made possible by the higher density, Meyer said.

All 6,250 bit/in. units will accommodate existing 1,600 bit/in formats since 1,600 is a simple subset when compared to the complexity of the 6,250 design, he added.

New Media Coming

As for future developments, Meyer foresees a move to new tape media, probably 2.5-in.-wide tape comparable to IBM's 3850. The industry is moving away from 1/2-inch tape as primary backup storage, he said.

But the demise of 1/2-in. magnetic tape is still far in the future; transfer rates and format with this media will be equivalent to and interchangeable with disk storage and will provide an ideal backup storage capability, he said.

In addition, advances in mass data communications processing will minimize the need for data interchanges using 1/2-in. tape in many applications.

"Actually, direct CPU-to-CPU communications is well under way in larger systems with less and less need for interchange media. However, expanding applications, particularly in minicomputer systems, has led to an overall increase in the tape drive market, although the number of tape drives per system is declining," Meyer said.

"Also, even where there are direct CPU-to-CPU communications, tape storage will continue to be used as an auxiliary storage for security and a continuous record train."

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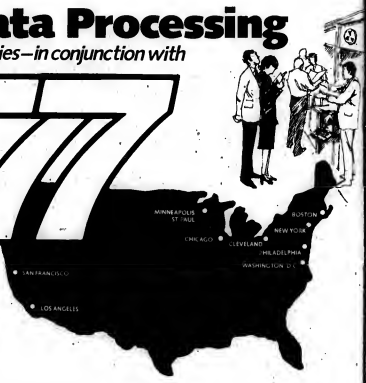

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Assistant Professor in Nuclear Engineering at the Assistant Professor level. Applicants must have background in Nuclear Engineering and strong capabilities in the application of minicomputer hardware and software to research. Capabilities in computer interfacing and software for the development of novel computer interfaces highly desirable. PhD degree required. Submit resume to: **Professor J. Corelli, Executive Officer, Department of Nuclear Engineering, RENSSELAER POLYTECHNIC INSTITUTE, Troy, N.Y. 12181. An equal opportunity/affmative action employer.**

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The FJC hiras direct. Civil Service status not required. Liberal fringe benefits associated with federal employment offered. Send resume/SF-171 to Mr. John Allen, Project Manager, COURTRAN II, U.S. District Courthouse, Room 1415, 3rd & Constitution Ave., N.W., Washington, D.C. 20001.

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position announcements

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Storage Technology Corporation
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position announcements

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position announcements

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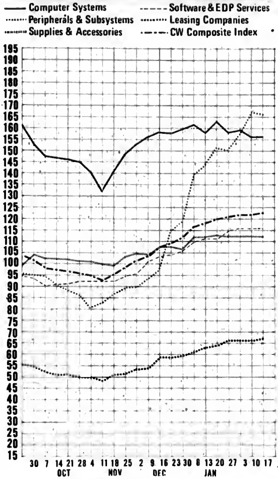

Earnings Reports

AUTOMATIC DATA PROCESSING
Three Months Ended Dec. 31

	1976	a1975
Shr Ernd	$.39	$.31
Revenue	67,820,000	45,899,000
Earnings	5,605,000	4,457,000
6 Mo Shr	.72	.57
Revenue	111,877,000	88,046,000
Earnings	10,357,000	8,176,000

a-Restated to reflect June 1976 two-for-one stock split.

CENTRONICS
Three Months Ended Dec 31

	1976	1975
Shr Ernd	$.65	$.55
Revenue	14,384,625	13,201,378
Earnings	3,140,929	2,655,788
6 Mo Shr	1.22	1.00
Revenue	27,220,336	24,403,944
Earnings	5,921,959	4,796,590

COMPUSCAN
Three Months Ended Nov. 30

	1976	1975
Shr Ernd	$.14	$.19
Revenue	3,746,000	3,149,000
Tax Cred	....	102,000
Earnings	295,000	329,000
6 Mo Shr	26	40
Revenue	6,678,000	5,945,000
Tax Cred	....	261,000
Earnings	554,000	670,000

COMPUTER HORIZONS
Nine Months Ended Nov 30

	1976	1975
Shr Ernd	$.21	....
Revenue	2,833,685	82,012,280
Earnings	118,144	(16,365)

COMPUTER SCIENCES
13 Weeks Ended Dec. 31

	1976	1975
Shr Ernd	$.26	$.13
Revenue	58,093,000	54,087,000
Tax Cred	750,000	
Earnings	3,809,000	1,656,000
39 Wk Shr	.75	36
Revenue	171,677,000	158,000,000
Tax Cred	2,250,000	....
Earnings	10,785,000	6,105,000

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Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, FEBRUARY 16, 1977

All statistics compiled, computed and formatted by TRADE★QUOTES, INC. Cambridge, Mass. 02139

EXCH		1976-77 RANGE (1)	CLOSE FEB 16 1977	WEEK NET CHNGE	WEEK PCT CHNGE
	COMPUTER SYSTEMS				
O	AMDAHL CORP	23- 40	33 3/4	0	0.0
N	BURROUGHS CORP	69-108	73	+4 1/4	+6.1
O	COMPUTER AUTOMATION	10- 25	23 3/4	+ 5/8	+2.7
N	CONTROL DATA CORP	18- 27	23	- 1/2	-2.1
N	DATA GENERAL CORP	40- 60	44 7/8	+2 3/4	+6.5
O	DATAPOINT CORP	24- 46	23 3/4	-1 1/4	-5.0
O	DIGITAL COMP CONTROL	2- 7	6 5/8	0	0.0
N	DIGITAL EQUIPMENT	44- 60	46 1/4	+2 1/2	+5.7
N	ELECTRONIC ASSOC.	2- 5	2 1/2	- 1/8	-4.7
A	ELECTRONIC ENGINEER.	7- 16	8 3/8	+ 1/4	+3.0
O	FOUR-PHASE SYSTEMS	13- 21	14 7/8	- 3/8	-2.4
N	FOXBORO	28- 51	43 1/4	- 1/2	-1.1
O	GENERAL AUTOMATION	4- 11	8 1/4	+ 1/2	+6.4
O	GRI COMPUTER CORP	1- 1	3/8	0	0.0
N	HEWLETT-PACKARD CO	69-117	75	+4	+5.6
N	HONEYWELL INC	34- 56	45 7/8	+ 5/8	+1.3
N	IBM	227-288	271 1/2	+3 1/2	+1.3
O	MANAGEMENT ASSIST	1- 9	8 1/4	+ 1/8	+1.5
O	MEMOREX	17- 33	25 5/8	+ 7/8	+3.5
O	MICRODATA CORP	10- 28	9 5/8	-4 1/4	-30.6
O	MODULAR COMPUTER SYS	3- 14	5 3/4	- 1/4	-4.1
N	NCR	24- 38	37 1/8	+ 1/4	+0.6
O	PRIME COMPUTER INC	4- 18	15	0	0.0
N	PERKIN-ELMER	19- 27	18 3/8	+ 3/8	+2.0
N	RAYTHEON CO	45- 67	58 1/8	+1 1/8	+1.9
N	SPERRY RAND	38- 52	35 7/8	+ 5/8	+1.5
O	SYCOR INC	9- 31	12 5/8	-1	-7.3
A	SYSTEMS ENG. LABS	5- 10	6	- 1/4	-4.0
N	VARIAN ASSOCIATES	12- 19	18 1/2	- 3/8	-1.9
A	WANG LABS.	11- 20	16 1/4	+ 3/4	+4.8
	LEASING COMPANIES				
O	BOOTHE COMPUTER CORP	0- 0	10	- 1/8	-1.2
O	COMDISCO INC	3- 13	12 3/4	+ 3/4	+6.2
A	COMMERCE GROUP CORP	2- 3	2 1/8	+ 1/8	+6.2
A	COMPUTER INVSTRS GRP	1- 3	1 1/2	0	0.0
N	DATRONIC RENTAL	1- 8	1 3/8	- 1/8	-8.3
A	DCL INC	1- 2	1 5/8	0	0.0
M	DPF INC	5- 8	7 1/2	- 1/8	-1.6
N	ITEL	6- 16	14 1/2	- 3/4	-4.9
N	LEASCO CORP	6- 22	19 5/8	+ 1/4	+1.2
O	LEASPAC CORP	0- 1	3/4	0	0.0
O	NRG INC	0- 1	1/4	0	0.0
A	PIONEER TEX CORP	6- 11	10 1/4	- 3/8	-3.5
N	U.S. LEASING	7- 12	11	- 1/4	-2.2

EXCH: N=NEW YORK; A=AMERICAN; P=PHIL-BALT-WASH
L=NATIONAL; M=MIDWEST; C=OVER-THE-COUNTER
O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR

EXCH		1976-77 RANGE (1)	CLOSE FEB 16 1977	WEEK NET CHNGE	WEEK PCT CHNGE
	SOFTWARE & EDP SERVICES				
O	ADVANCED COMP TECH	1- 3	1 3/8	- 1/4	-15.3
O	ANACOMP INC	6- 11	8 1/2	0	0.0
A	APPLIED DATA RES.	2- 7	6	- 1/4	-4.0
N	AUTOMATIC DATA PROC.	17- 35	24	+ 1/4	+1.0
O	COLEMAN AMERICAN COS	2- 6	2 1/8	+ 1/4	+13.3
O	COMPU-SERV NETWORK	3- 15	14	0	0.0
O	COMPUTER DIMENSIONS	3- 7	6 5/8	0	0.0
C	COMP ELECTION SYSTMS	5- 9	7 1/2	0	0.0
O	COMPUTER HORIZONS	1- 2	1 1/2	+ 1/4	+20.0
C	COMPUTER NETWORK	2- 8	7 1/8	- 1/8	-1.7
N	COMPUTER SCIENCES	4- 9	7 3/4	+ 1/4	+3.3
O	COMPUTER TASK GROUP	1- 2	1 1/4	0	0.0
C	COMPUTER USAGE	2- 6	2 1/2	0	0.0
O	COMSHARE	2- 9	5 1/2	- 1/2	-8.3
O	DATA DIMENSIONS INC	2- 5	4 7/8	0	0.0
O	DATATAB	1- 2	1 1/2	0	0.0
N	ELECTRONIC DATA SYS.	12- 19	18 1/4	- 1/8	-0.6
O	INFORMATIONAL INC	1- 1	1/8	0	0.0
O	INSYTE CORP	1- 3	2 3/8	- 1/8	-5.0
C	IPS COMPUTER MARKET.	1- 2	3/4	0	0.0
O	KEANE ASSOCIATES	2- 4	2 5/8	0	0.0
O	KEYDATA CORP	1- 5	2 5/8	- 1/8	-4.5
A	LOGICON	3- 9	8 3/4	+ 5/8	+7.6
A	MANAGEMENT DATA	1- 3	1 3/4	+ 1/4	+16.6
A	NATIONAL CSS INC	13- 25	22	-1	-4.3
O	NATIONAL DATA CORP	4- 7	6 1/8	0	0.0
A	ON LINE SYSTEMS INC	17- 23	21 1/4	- 1/4	-1.1
N	PLANNING RESEARCH	3- 5	4 1/4	- 1/8	-2.8
O	PROGRAMMING & SYS.	1- 1	3/8	0	0.0
O	RAPIDATA INC	2- 5	2	0	0.0
O	REYNOLDS & REYNOLD	13- 21	18	- 1/4	-1.3
C	SCIENTIFIC COMPUTERS	1- 2	1 5/8	- 1/4	-13.3
O	TYMSHARE INC	14- 28	16	+ 1/2	+3.2
A	URS SYSTEMS	3- 5	4 1/8	+ 1/8	+3.1
N	WYLY CORP	1- 7	1 5/8	+ 1/8	+8.3
	PERIPHERALS & SUBSYSTEMS				
N	ADDRESSOGRAPH-MULT	8- 14	13 3/4	- 1/8	-0.9
O	ADVANCED MEMORY SYS	4- 10	7 5/8	0	0.0
N	AMPEX CORP	5- 10	8 3/8	0	0.0
O	ANDERSON JACOBSEN	2- 4	3 1/2	+ 1/8	+3.7
O	APPLIED DIG DATA SYS	13- 28	14 1/8	- 1/4	-1.7
O	BEEHIVE MEDICAL ELEC	3- 12	10 1/8	- 5/8	-5.8
A	BOLT,BERANEK & NEW	7- 11	7 1/4	+ 1/4	+3.5
N	BUNKER-RAMO	5- 11	9 3/8	- 3/4	-7.4
A	CALCOMP	4- 7	3 3/4	- 5/8	-14.2
O	CAMBRIDGE MEMORIES	0- 6	1	- 1/8	-11.1
N	CENTRONICS DATA COMP	20- 36	26 3/8	+1 3/8	+5.5
O	CODEX CORP	22- 47	47 1/4	+1 1/4	+2.7
O	COGNITRONICS	1- 1	1 1/8	0	0.0
O	COMPUTER COMMUN.	1- 6	5 5/8	0	0.0
O	COMPUTER CONSOLES	4- 7	4 3/4	0	0.0
A	COMPUTER EQUIPMENT	1- 3	2	+ 1/8	+6.6
O	COMPUTER TRANSCEIVER	1- 3	1 3/8	+ 3/8	+37.5
O	CCPTIA	4- 13	12 3/4	+ 3/4	+6.2
N	CONRAC CORP	20- 27	23 3/4	-1 1/2	-5.9

EXCH		1976-77 RANGE (1)	CLOSE FEB 16 1977	WEEK NET CHNGE	WEEK PCT CHNGE
O	DATA ACCESS SYSTEMS	1- 5	5 1/4	0	0.0
O	DATA 100	5- 13	7 1/4	- 3/8	-4.9
A	DATA PRODUCTS CORP	5- 15	12 1/8	+ 1/8	+1.0
O	DATA TECHNOLOGY	1- 3	3	0	0.0
O	DATUM INC	1- 2	1 1/8	0	0.0
C	DECISION DATA COMPUT	1- 4	2	0	0.0
O	DELTA DATA SYSTEMS	1- 1	1/2	+ 1/8	+33.3
N	ELECTRONIC M & M	1- 4	4	0	0.0
O	FABRI-TEK	1- 1	1	-	-5.5
O	GENERAL COMPUTER SYS	0- 2	1/2	+ 1/8	+33.3
N	HAZELTINE CORP	4- 12	11	- 1/8	-1.1
N	HARRIS CORP	27- 35	31 7/8	+ 7/8	+2.8
A	INCOTERM CORP	9- 20	14 1/4	+ 3/8	+2.7
O	INFOREX INC	3- 7	6 1/4	+ 1/8	+2.0
O	INFORMATION INTL INC	10- 18	11 3/4	- 1/8	-1.0
O	INTEL CORP	47-109	56	+2	+3.7
A	LUNDY ELECTRONICS	3- 7	3 3/4	- 1/2	-11.7
O	MSI DATA CORP	3- 8	7 1/2	+ 3/8	+5.2
N	MILGO ELECTRONICS	15- 37	37 1/8	0	0.0
N	MOHAWK DATA SCI	3- 10	6 3/4	- 1/4	-3.5
O	PENRIL CORP	1- 3	4	+1 3/8	+52.3
A	PERTEC CORP	3- 9	8	+ 3/8	+4.9
A	POTTER INSTRUMENT	2- 2	1 3/4	0	0.0
O	PRECISION INST.	2- 10	2	0	0.0
O	QUANTOR CORP	4- 6	4 5/8	0	0.0
O	RECOGNITION EQUIP	6- 11	8 7/8	- 1/2	-5.3
N	SANDERS ASSOCIATES	6- 12	11 3/4	+ 1/4	+2.1
O	SCAN DATA	1- 4	1 7/8	0	0.0
O	STORAGE TECHNOLOGY	9- 13	11 5/8	+ 5/8	+5.6
O	T BAR INC	5- 10	7 5/8	+ 1/8	+1.6
O	TALLY CORP.	4- 6	5 7/8	- 3/8	-6.0
C	TEC INC	3- 9	8 1/4	- 1/4	-2.9
N	TEKTRONIX INC	45- 69	58 5/8	+ 3/8	+0.6
N	TELEX	2- 5	3	+ 1/8	+4.3
O	WANGCO INC	11- 22	17 1/2	0	0.0
O	WILTEK INC	1- 2	1/4	0	0.0
	SUPPLIES & ACCESSORIES				
O	ADVANCED SYSTEMS INC	1- 4	3 3/8	0	0.0
O	BALTIMORE BUS FORMS	3- 5	3 1/8	0	0.0
A	BARRY WRIGHT	6- 12	11 1/8	+ 1/4	+2.2
O	CYBERMATICS INC	0- 1	5/8	0	0.0
A	DATA DOCUMENTS	25- 41	41	0	0.0
O	DUPLEX PRODUCTS INC	13- 24	14 1/2	+ 1/4	+1.7
A	ENNIS BUS. FORMS	6- 8	7 7/8	- 1/8	-2.0
O	GRAHAM MAGNETICS	8- 13	12 1/4	- 1/4	-2.0
C	GRAPHIC CONTROLS	13- 19	15 1/2	+ 1/4	+1.6
N	3M COMPANY	49- 66	56 5/8	+1 1/4	+2.5
O	MOORE CORP LTD	31- 51	31 1/2	+ 1/2	+1.6
N	NASHUA CORP	11- 20	17 3/4	+ 3/8	+2.1
O	STANDARD REGISTER	15- 19	18	0	0.3
O	TAB PRODUCTS CO.	5- 16	15 1/2	+ 1/4	+1.6
N	UARCO	19- 25	21	+ 1/4	+1.2
A	WABASH MAGNETICS	4- 14	12 7/8	- 5/8	-4.6
N	WALLACE BUS. FORMS	19- 25	15 3/4	- 1/4	-1.2

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